CCS Technical Documentation
NSB-9 Series Transceivers

Service Software Instructions

Draft 1 02/03
Copyright ©Nokia. All rights reserved.

[This page left intentionally blank]

Copyright ©Nokia. All rights reserved.

Quick Guide for Phoenix Service SW Installation 5
Phoenix Installation Steps in Brief 5
Phoenix Service SW 6
Before Installation 6
Startup 7
Dongle Driver Installation and Version Check 8
First Time Installation of Phoenix 9
Update Installation of Phoenix 12
How to Uninstall Phoenix 13
Data Package for Phoenix (Product Specific) 15
Before installation 15
Installation of Phoenix Data Package (Product Specific) 16
How to Uninstall Data Package 19
How to Manage Connections 20
How to Update Flash Support Files for FPS-8* and FLS-4* 23
Before Installation 23
Installing the Flash Support Files 23
How to Update The FPS-8* Flash Prommer SW 26
FPS-8 Activation and Deactivation 28
Activation 28
Deactivation 30
JBV-1 Docking Station SW 31
Before Installation 31
Installing SW Needed for the JBV-1 SW Update 32
Updating the JBV-1 Docking Station Software 36
Receiver tuning: Quick Guide for Tuning With Phoenix 39
General remarks 39
RF Tuning and Calibration Instructions for Iris HDB58 40
Introduction 40
RX tunings 40
TX tunings 44
TX IQ Tuning 45
Service Tool Concept For Baseband Tuning Operations 46
Service Concept for NSB-9 Baseband tunings 47
Baseband Tuning operations 48
Energy Management Tuning 48
LCD Contrast Tuning 50
Flashing Setup Instructions 71
POS (Point of Sale) Flash Concept 71
Flash Concept with flashing adapter 72
Module Jig Concept 73
JBV-1 Flash Concept 74
Service Concept 76
Parallel Flash concept 77

Copyright ©Nokia. All rights reserved..

Copyright ©Nokia. All rights reserved.

Quick Guide for Phoenix Service SW Installation

Phoenix Installation Steps in Brief

DCT-4 generation Test and Service Software is called "Phoenix"

These are the basic steps to install the Phoenix

- Install the Phoenix Service SW
- Install the Data Package for Phoenix (product specific data and flash update package)
- Manage connection settings (depends on the tools you are using)
- Update FPS-8 SW (if you use FPS-8)
- Activate FPS-8
- Update JBV-1 Docking Station SW (only when needed)

The flash update files are delivered with then Phoenix Data Package so unless you want to use certain version of this package, separate installation package is not needed anymore. If you want to use it, it should be installed after connection management, before FPS-8 update.

Please refer to Service Manual and Technical Bulletins for more information concerning phone model specific service tools and equipment setup.

Copyright ©Nokia. All rights reserved.

Phoenix Service SW

Before Installation

- Check that a Dongle is attached to the parallel port of your computer.
- Download the installation package (e.g. ***phoenix_service_sw_a3_03_83_005.exe***) to your computer (e.g. C:\TEMP)
- Close all other programs
- Run the application file (e.g. ***phoenix_service_sw_a3_03_83_005.exe****)* and follow instructions on the screen
- Administrator rights may be required to be able to install Phoenix depending on the Operating System
- If the dongle driver is installed or updated, you need to reboot your PC before the installation can continue.
- If uninstalling or rebooting is needed at any point, you will be prompted by the Install Shield program.

If at any point during installation you get this message, Dongle is not found and installation can´t continue.

Possible reasons may be defective or too old PKD-1Dongle (five digit serial number Dongle when used with FPS-8 Prommer) or that the FLS-4S POS Flash Dongle is defective or power to it is not supplied by external charger.

Check the COM /parallel ports used first! After correcting the problem Installation can be restarted.

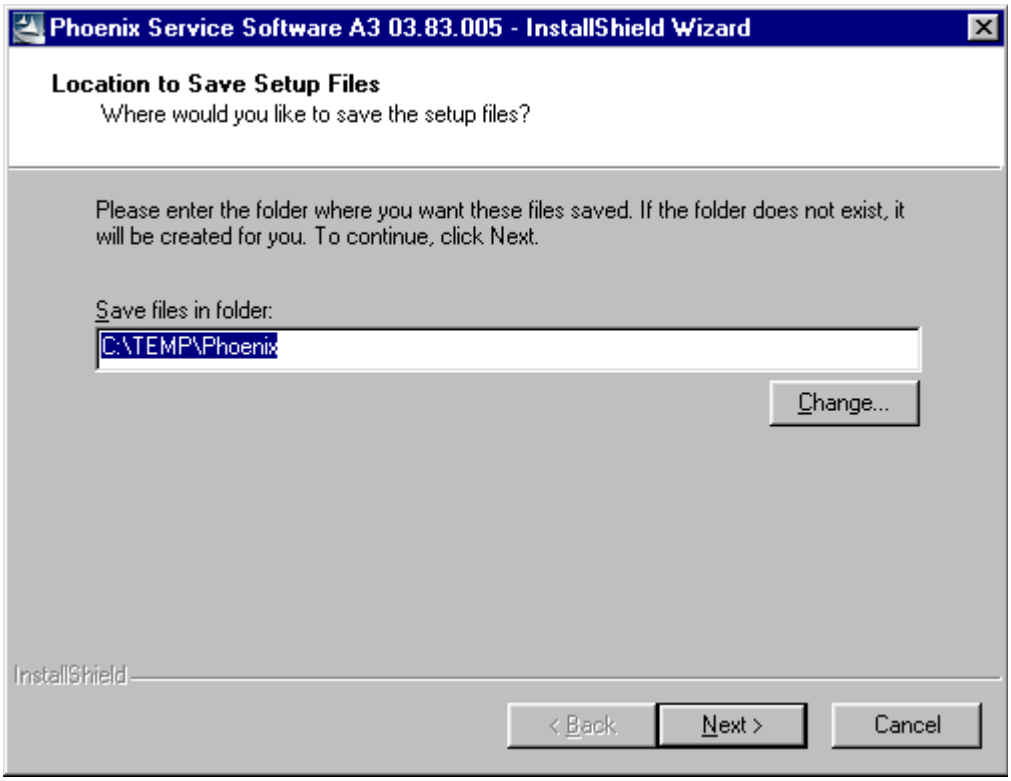
Dongle not found
Insert Nokia dongle and click Retry to re-detect the dongle or click Cancel to exit the installation.
Retry
Cancel

 Copyright ©Nokia. All rights reserved.

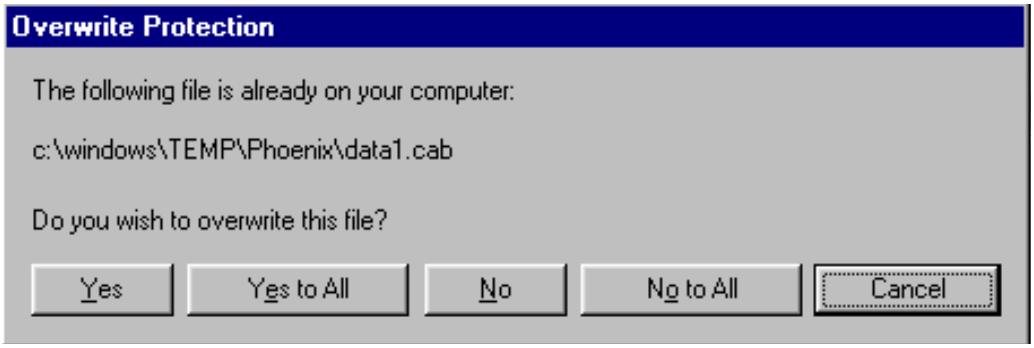
Startup

Run the ***phoenix_service_sw_a3_03_83_005.exe*** to start installation.

When you choose "Next" the files needed for installation will be extracted. Kindly wait.


Phoenix Service Software A3 03.83.005 - InstallShield Wizard
Location to Save Setup Files
Where would you like to save the setup files?
Please enter the folder where you want these files saved. If the folder does not exist, it will be created for you. To continue, click Next.
Save files in folder:
C:\TEMP\Phoenix
Change...
InstallShield
< Back
Next >
Cancel

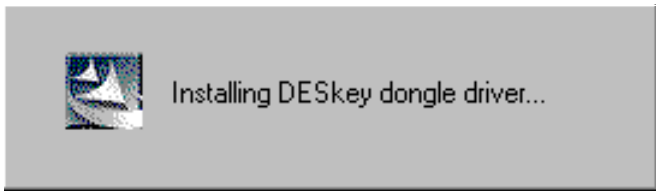
If the setup files are already extracted (left in the file system from previous installation) following dialog appears. Always click "Yes to All" to overwrite the existing setup files.



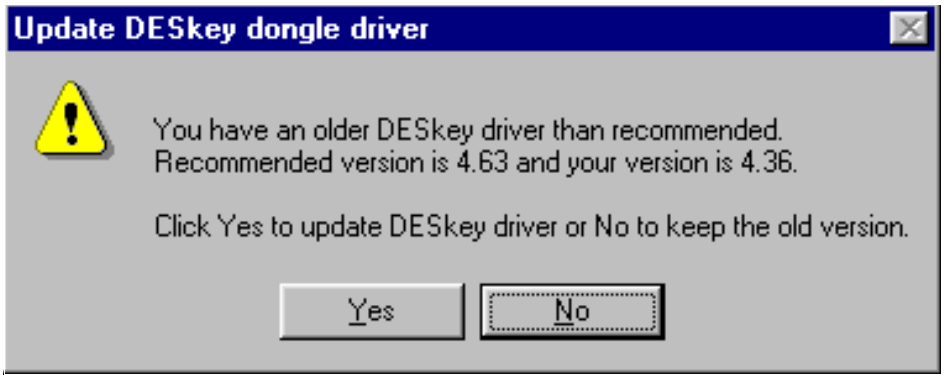
 Copyright ©Nokia. All rights reserved.

Dongle Driver Installation and Version Check

If there is no previously installed Dongle driver, installation will take place...

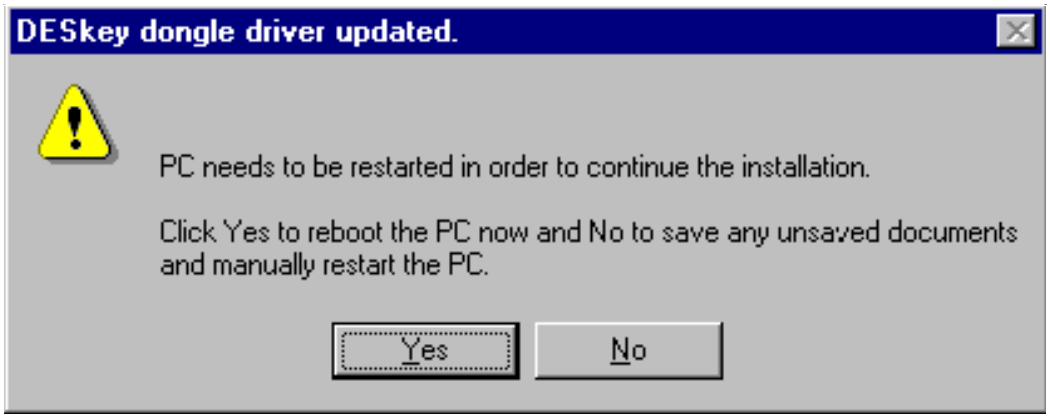


If the Dongle driver is installed and it is older than the latest supported version, the latest version will be installed when you choose "Yes". The latest version is always included in the latest Phoenix installation package.


Update DESkey dongle driver
You have an older DESkey driver than recommended.
Recommended version is 4.63 and your version is 4.36.
Click Yes to update DESkey driver or No to keep the old version.
Yes
No

PC needs to be rebooted before installation can continue. Click "Yes" to reboot the PC.

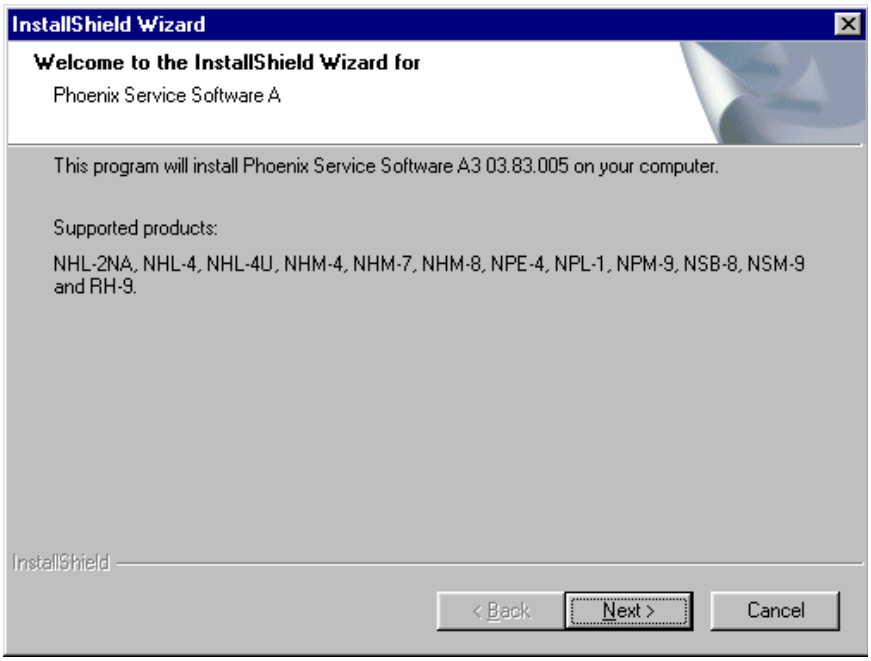
Setup is restarted automatically after reboot.


DESkey dongle driver updated.
PC needs to be restarted in order to continue the installation.
Click Yes to reboot the PC now and No to save any unsaved documents and manually restart the PC.
Yes
No

Copyright ©Nokia. All rights reserved.

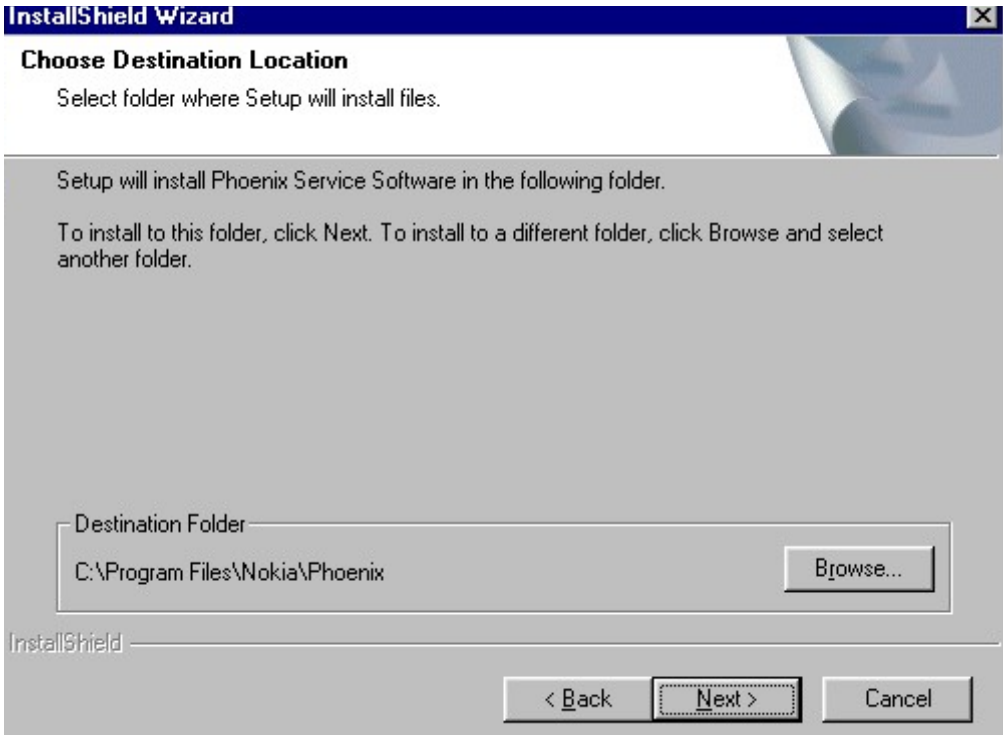
First Time Installation of Phoenix

After Dongle driver installation / update (if needed) installation continues from this step. Click "Next" in Welcome dialog to continue.


InstallShield Wizard
Welcome to the InstallShield Wizard for
Phoenix Service Software A
This program will install Phoenix Service Software A3 03.83.005 on your computer.
Supported products:
NHL-2NA, NHL-4, NHL-4U, NHM-4, NHM-7, NHM-8, NPE-4, NPL-1, NPM-9, NSB-8, NSM-9 and RH-9.
InstallShield
< Back
Next >
Cancel

Choose the destination folder, it is recommended to use the default folder ***C:\Program-Files\Nokia\Phoenix***.

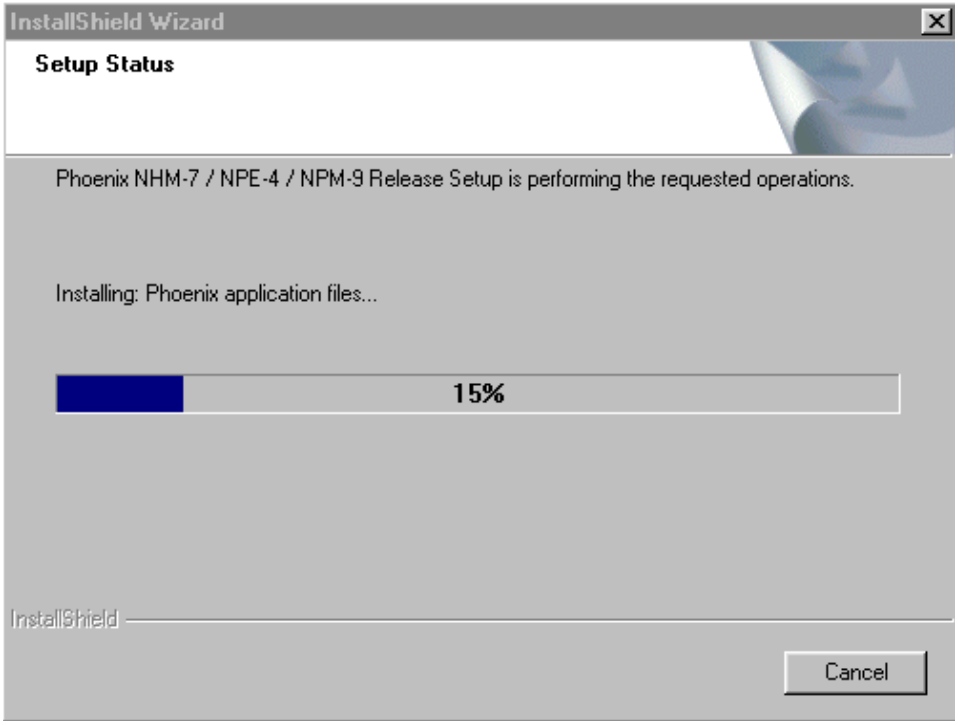
Choose "Next" to continue. You may choose another location by selecting "Browse" (not recommended)


InstallShield Wizard
Choose Destination Location
Select folder where Setup will install files.
Setup will install Phoenix Service Software in the following folder.
To install to this folder, click Next. To install to a different folder, click Browse and select another folder.
Destination Folder
C:\Program Files\Nokia\Phoenix
Browse...
InstallShield
< Back
Next >
Cancel

Setup copies the components, please wait.

 Copyright ©Nokia. All rights reserved.

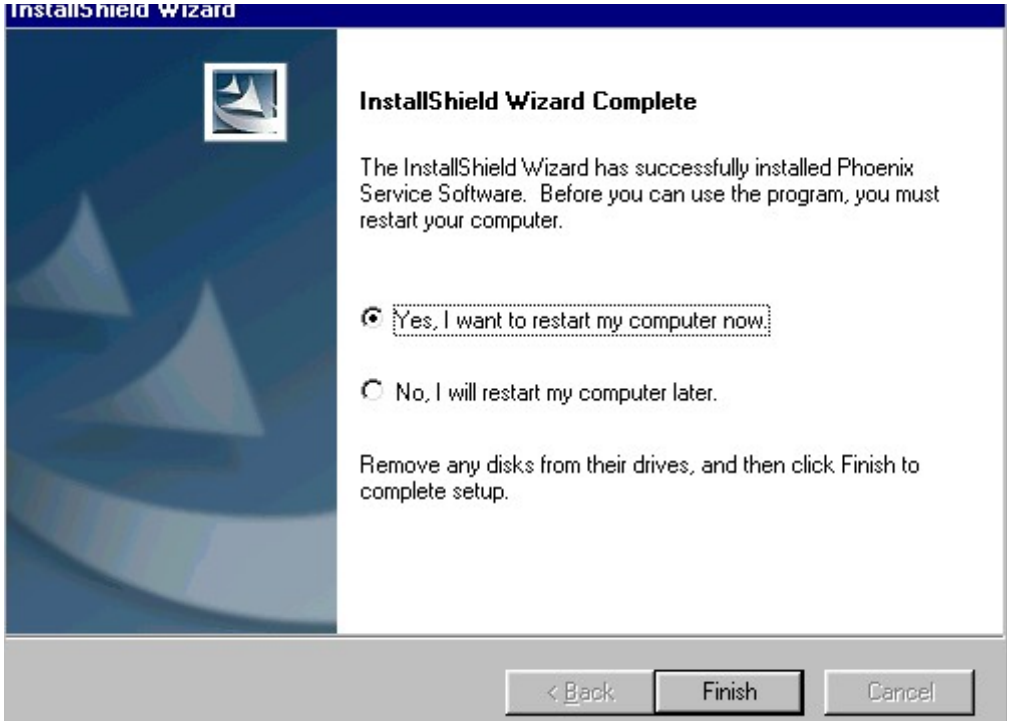
Progress of the setup is shown. Please wait...



If restarting of your computer is needed the Install Shield Wizard will tell you about it.

Select "Yes..." to reboot the PC immediatelly and "No..." to reboot the PC manually.

Note that Phoenix doesn't work, if components are not registered. Click "Finish" to continue.


InstallShield Wizard
InstallShield Wizard Complete
The InstallShield Wizard has successfully installed Phoenix Service Software. Before you can use the program, you must restart your computer.
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish to complete setup.
< Back
Finish
Cancel

After the reboot components are registered and Phoenix is ready for use.

 Copyright ©Nokia. All rights reserved.

If reboot is not needed components are registered after copying them.

If restarting of your computer is not needed, Click "Finish" to exit the setup.

Phoenix is now ready for use.

Now the installation of Phoenix Service SW is ready and it can be used after:

- **Installing Phone model specific Phone Data Package for Phoenix**
- **Configuring the connections**
- **Updating the Flash Update Package files used with FPS-8* and FLS-4* tools**

Copyright ©Nokia. All rights reserved.

Update Installation of Phoenix

If you already have the Phoenix Service SW installed on your computer, sooner or later there will be need to update it when new versions are released.

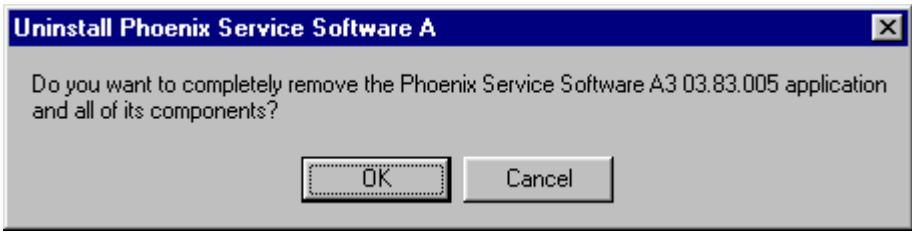
Please note that very often the Phoenix Service SW and the Phone Specific Data Package for Phoenix come in pairs, meaning that certain version of Phoenix can only be used with certain version of Data Package. Always use the latest available versions of both. Instructions can be found in phone model specific Technical Bulletins.

To update the Phoenix you need to take exactly the same steps as when installing it for the first time.

- Download the installation package to your computer hard disk
- Close all other programs
- Run the application file (e.g. ***phoenix_service_sw_a3_03_83_005.exe***)
- Dongle driver version will be checked and if need be, updated
- After reboot installation starts automatically
- Newer version of Phoenix will be installed

When you update the Phoenix from old to new version (e.g. update from 3.83.005 to 3.83.0055), the update will take place automatically without uninstallation

If you try update the Phoenix with the same version that you already have (e.g. 3.55 to 3.55) you are asked if you want to uninstall the version of Phoenix you have on your PC. Answer "OK" to uninstall Phoenix, "Cancel" if you don't want to uninstall.


Uninstall Phoenix Service Software A
Do you want to completely remove the Phoenix Service Software A3 03.83.005 application and all of its components?
OK
Cancel

If you try to install an older version (e.g. downgrade from 3.83.005 to 3.83.005) installation will be interrupted.

Always follow the instructions on the screen.

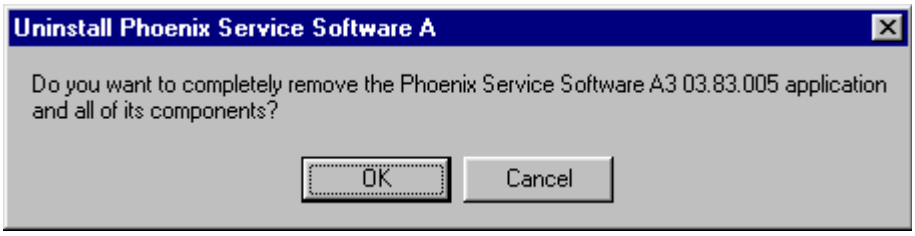
Copyright ©Nokia. All rights reserved.

How to Uninstall Phoenix

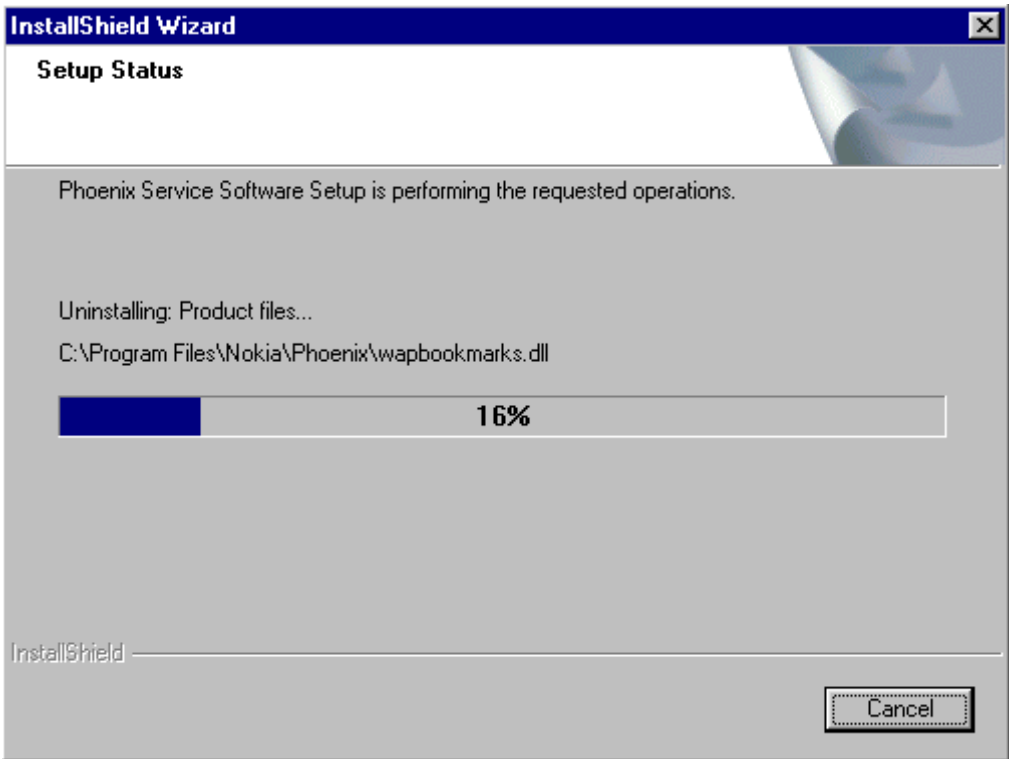
Uninstallation can be done manually from Windows Control Panel - Add / Remove Programs.

Choose "Phoenix Service Software" and click "Add/Remove".

Choose "OK" to uninstall

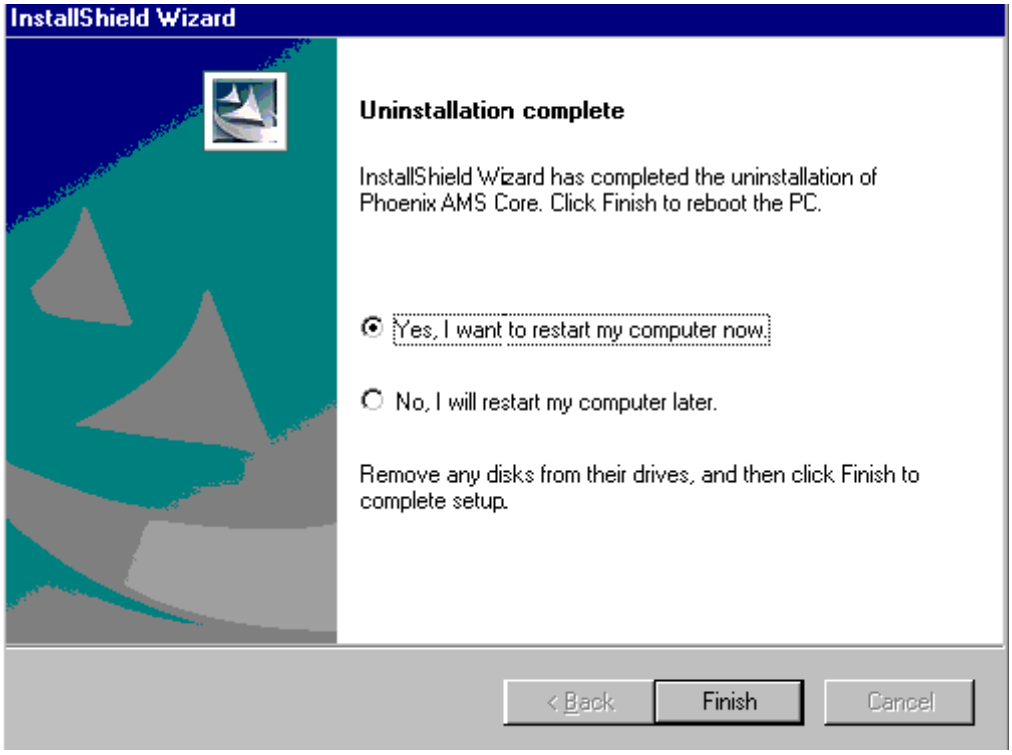

Uninstall Phoenix Service Software A
Do you want to completely remove the Phoenix Service Software A3 03.83.005 application and all of its components?
OK
Cancel

Progress of the uninstallation is shown.

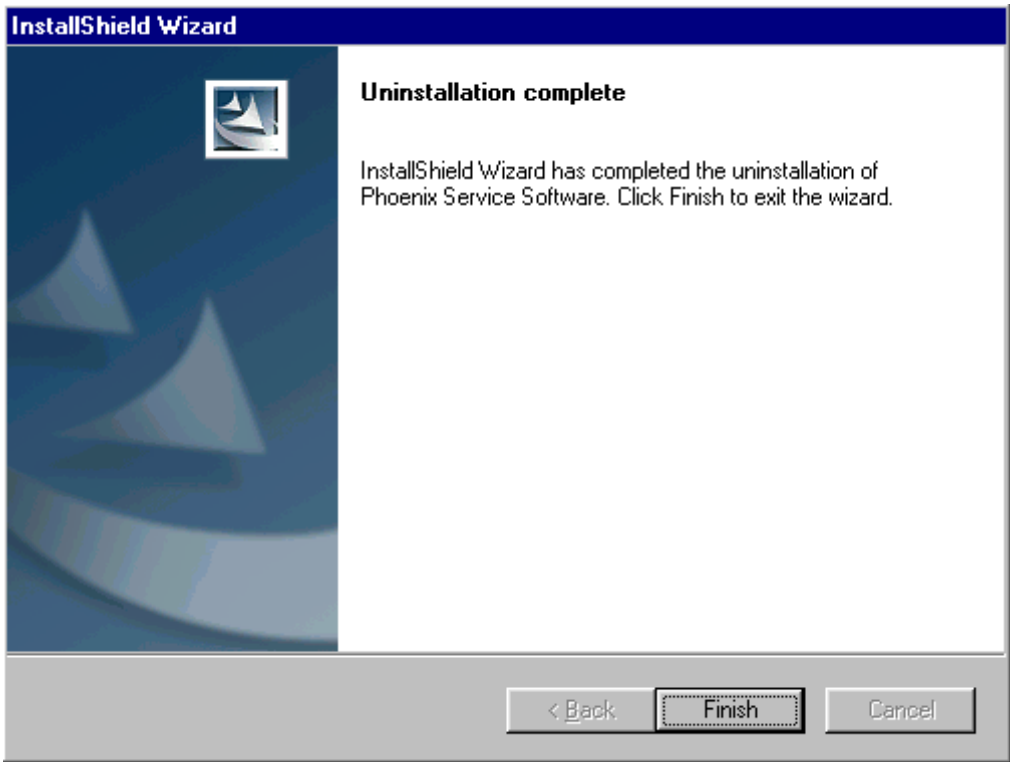


 Copyright ©Nokia. All rights reserved.

You may have to reboot the PC after uninstallation.


InstallShield Wizard
Uninstallation complete
InstallShield Wizard has completed the uninstallation of Phoenix AMS Core. Click Finish to reboot the PC.
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish to complete setup.
< Back
Finish
Cancel

If restarting is not needed, the following dialog will appear:


InstallShield Wizard
Uninstallation complete
InstallShield Wizard has completed the uninstallation of Phoenix Service Software. Click Finish to exit the wizard.
< Back
Finish
Cancel

Note! If you have different product packages installed, components are uninstalled only if they are not included in other product packages.

Copyright ©Nokia. All rights reserved.

Data Package for Phoenix (Product Specific)

Before installation

Product Data Package contains all product specific data to make the Phoenix Service Software and tools usable with a certain phone model.

It also includes the latest version of flash update package for FLS-4* and FPS-8*

- Check that the Dongle is attached to the parallel port of your computer.
- Install Phoenix Service SW
- Download the installation package (e.g. ***NSB-9_dp_1.00.exe***) to your computer (e.g. C:\TEMP)
- Close all other programs
- Run the application file (e.g.***NSB-9_dp_1.00.exe***) and follow instructions on the screen

If you already have the Phoenix Service SW installed on your computer, sooner or later there will be need to update it when new versions are released.

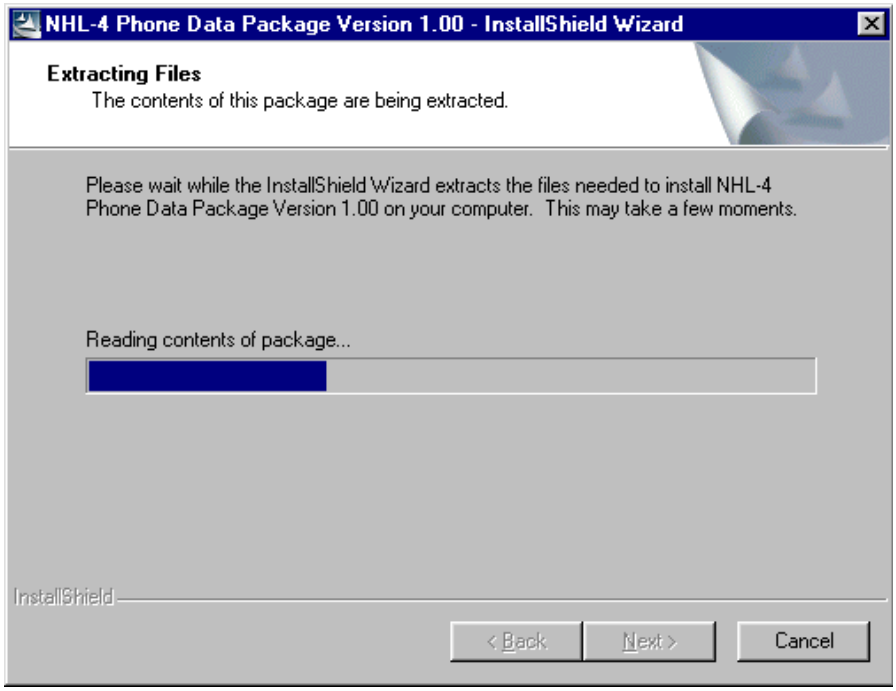
Please note that very often the Phoenix Service SW and the Phone Specific Data Package for Phoenix come in pairs, meaning that certain version of Phoenix can only be used with certain version of Data Package. Always use the latest available versions of both. Instructions can be found in phone model specific Technical Bulletins.

 Copyright ©Nokia. All rights reserved.

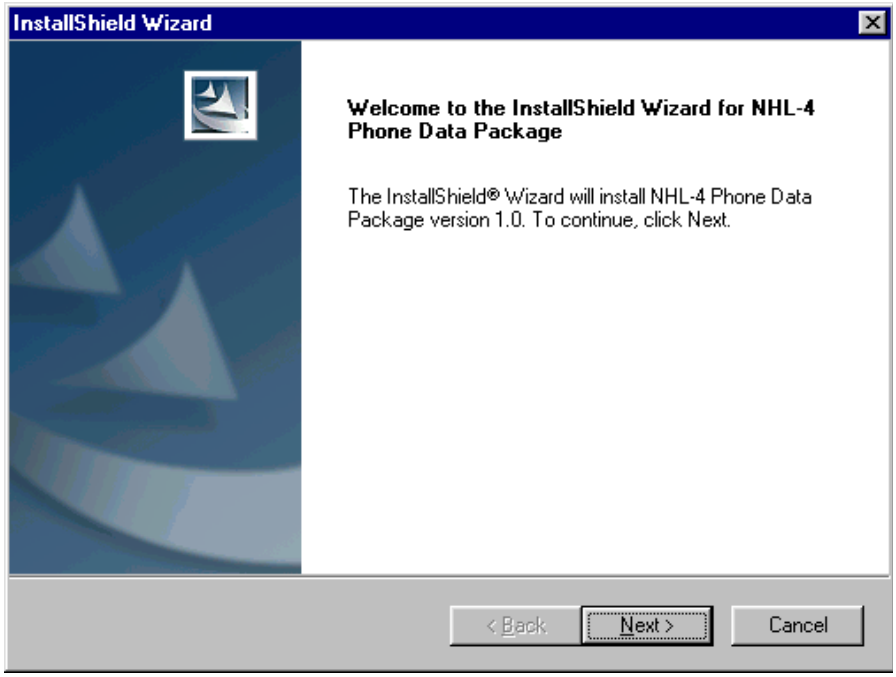
Installation of Phoenix Data Package (Product Specific)

Run the ***NSB-9_dp_v_1.00.exe*** to start installation.

When you choose "Next" the files needed for installation will be extracted. Please wait...


NHL-4 Phone Data Package Version 1.00 - InstallShield Wizard
Extracting Files
The contents of this package are being extracted.
Please wait while the InstallShield Wizard extracts the files needed to install NHL-4 Phone Data Package Version 1.00 on your computer. This may take a few moments.
Reading contents of package...
InstallShield
< Back
Next >
Cancel

Choose "Next" to continue.

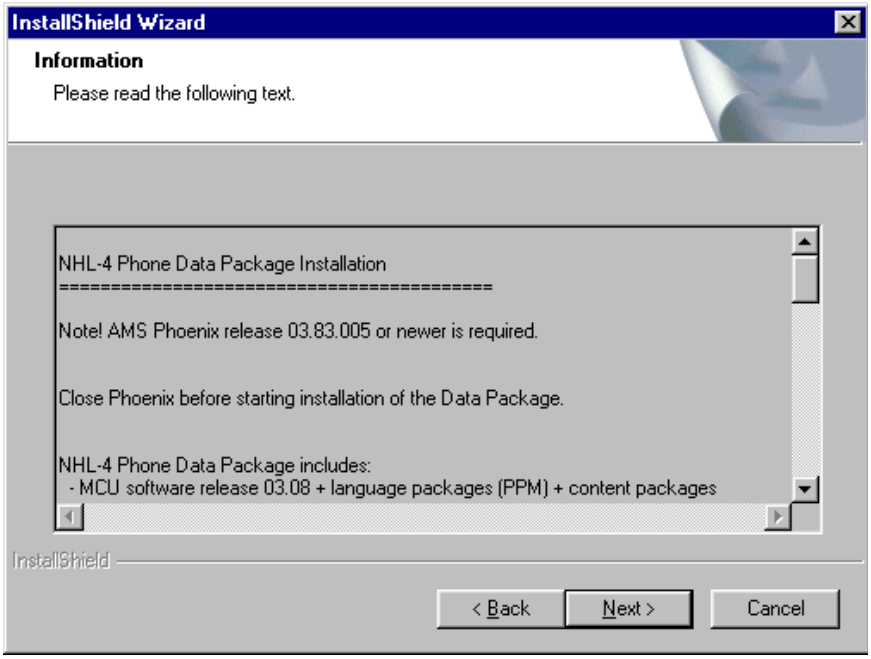

InstallShield Wizard
Welcome to the InstallShield Wizard for NHL-4 Phone Data Package
The InstallShield® Wizard will install NHL-4 Phone Data Package version 1.0. To continue, click Next.
< Back
Next >
Cancel

From this view you can see the contents of the Data Package.

Read the text carefully.

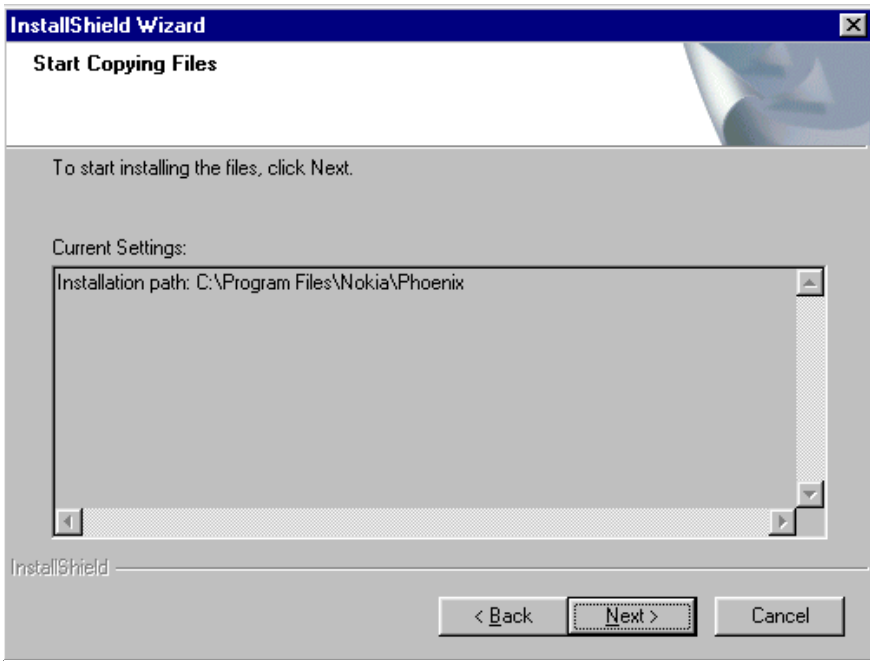
Copyright ©Nokia. All rights reserved.

There should be information about the Phoenix version needed with this data package. Choose “Next”.


InstallShield Wizard
Information
Please read the following text.
NHL-4 Phone Data Package Installation
==========
Note! AMS Phoenix release 03.83.005 or newer is required.
Close Phoenix before starting installation of the Data Package.
NHL-4 Phone Data Package includes:
- MCU software release 03.08 + language packages (PPM) + content packages
InstallShield
< Back
Next >
Cancel

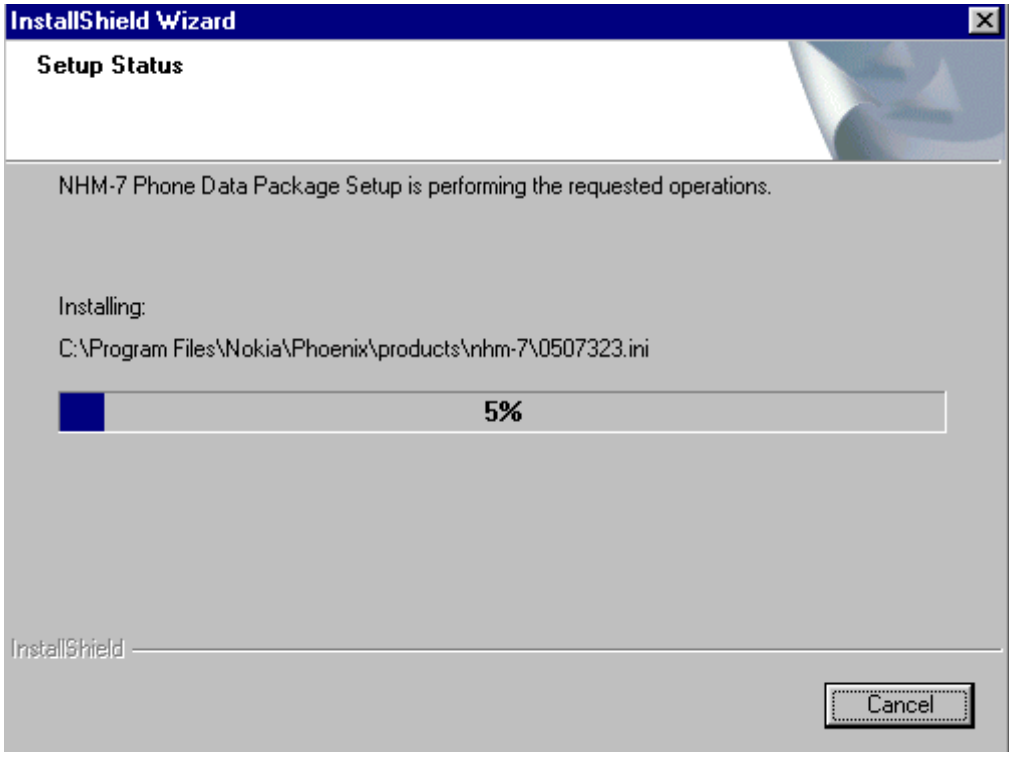
Confirm location and choose “Next” to continue.

Install Shield checks where the Phoenix application is installed and the directory is shown. Choose “Next” to continue.

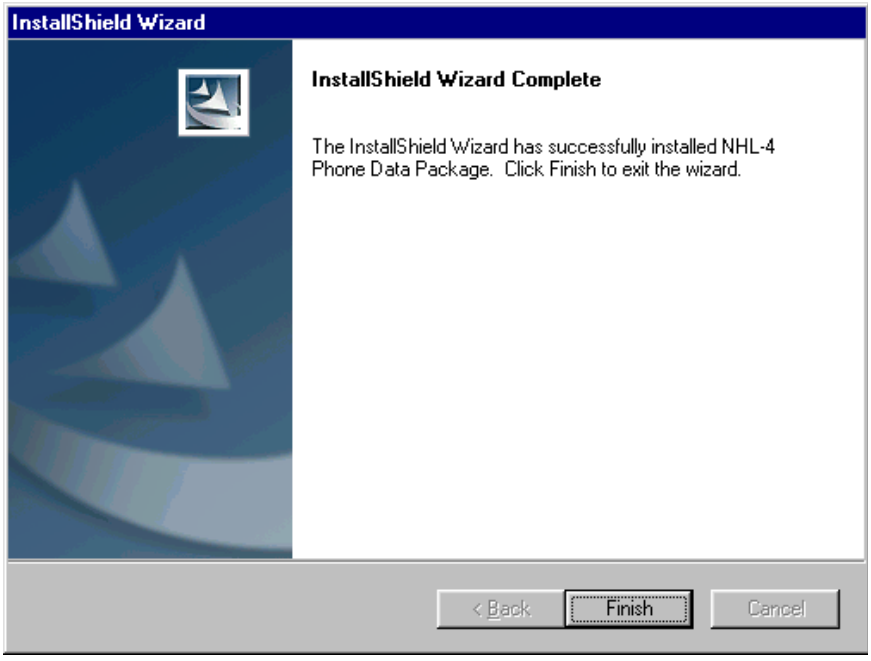


Phone model specific files will be installed... please wait.

 Copyright ©Nokia. All rights reserved.



Choose "Finish" to complete installation.


InstallShield Wizard
InstallShield Wizard Complete
The InstallShield Wizard has successfully installed NHL-4 Phone Data Package. Click Finish to exit the wizard.
< Back
Finish
Cancel

You now have all phone model specific files installed in your Phoenix Service SW.

 Copyright ©Nokia. All rights reserved.

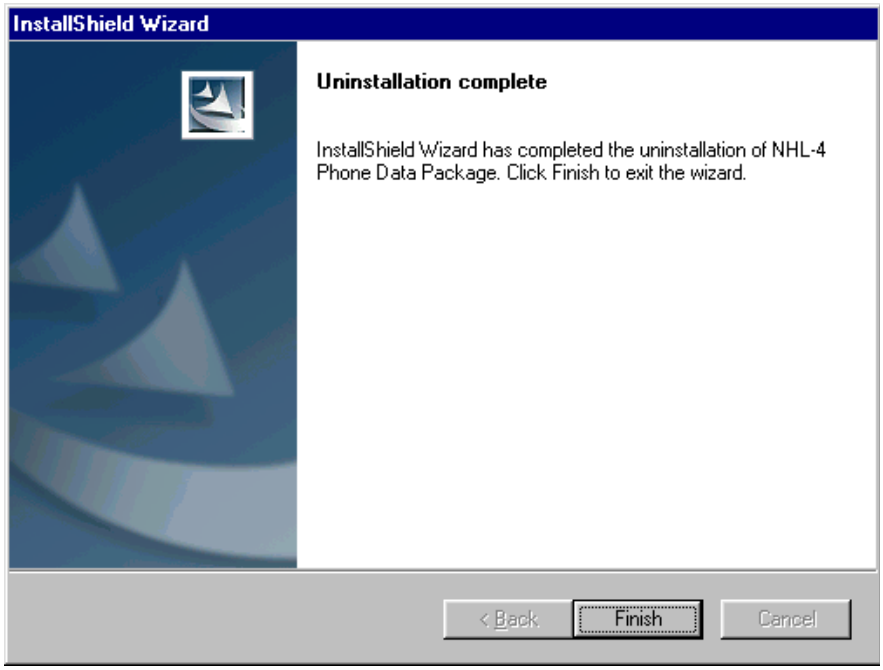
How to Uninstall Data Package

Uninstallation can also be done manually from Windows Control Panel / Add / Remove Programs/ “NSB-9 Phone Data Package”.

If you try to install the same version of Phoenix Data Package that you already have, you are asked if you want to uninstall the version you have on your PC. Answer “OK” to uninstall, “Cancel” if you don’t want to uninstall. Older versions of data packages do not need to be uninstalled.

Uninstall NHL-4 Phone Data Package
Do you want to completely remove the Phone Data Package application and all of its components?
OK
Cancel

Once the previously installed Data package is uninstalled, choose “Finish”.


InstallShield Wizard
Uninstallation complete
InstallShield Wizard has completed the uninstallation of NHL-4 Phone Data Package. Click Finish to exit the wizard.
< Back
Finish
Cancel

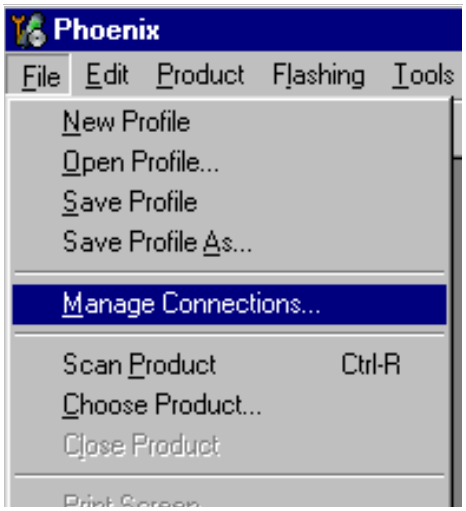
Run the ***NSB-9_dp_v_1.00.exe*** again to continue installation from the beginning.

 Copyright ©Nokia. All rights reserved.

How to Manage Connections

Start Phoenix Service SW and Login.

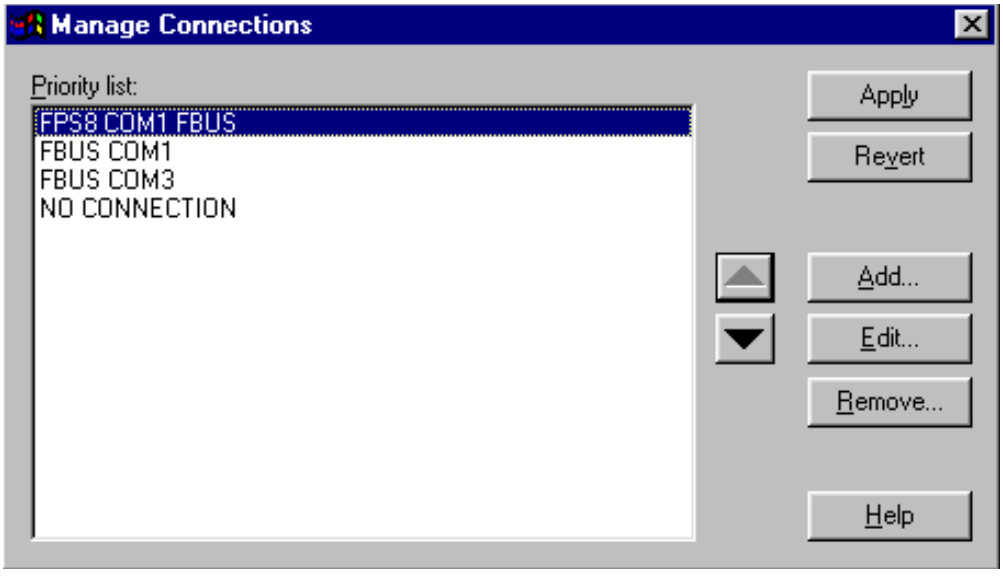
Choose "Manage Connections" From "File" – Menu



Existing connections can be selected, edited, deleted and new ones created by using this dialog.

A connection can be created either manually or by using a Connection Wizard.

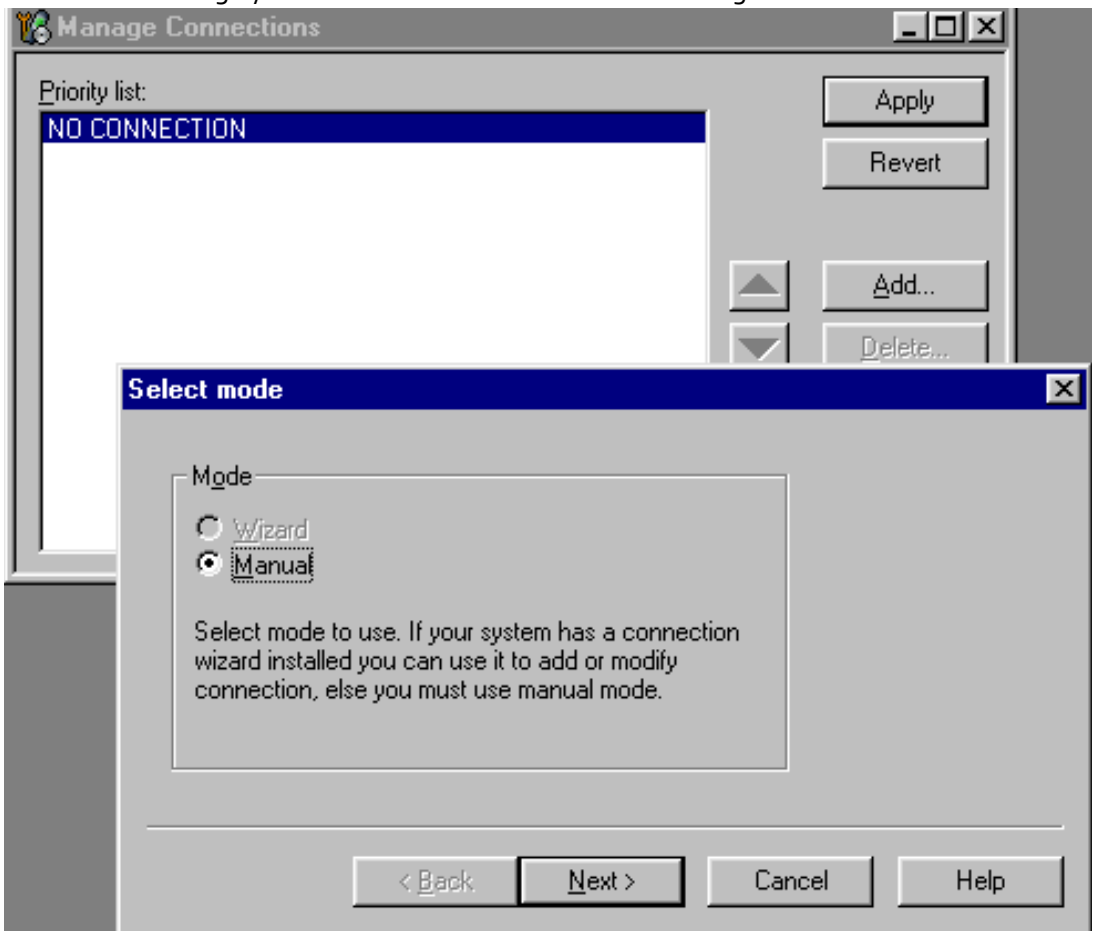
To add new connection, choose "Add" and select if you want to create it manually or by using the Wizard.



Choose "Next" to continue.

 Copyright ©Nokia. All rights reserved.

In the next dialogs you will be asked to select some settings for the connection



Manual Settings

A) For **FLS-4S POS Flash Device** choose following connection settings

Media: FBUS

COM Port: Virtual COM Port used by FLS-4 **Please check this always!**

(To check please go to Windows / Control Panel / FLS Virtual Port / Configuration)

B) For **FPS-8 Flash Prommer** choose following connection settings:

Media: FPS-8

Port Num: COM Port where FPS-8 is connected

COMBOX_DEF_MEDIA: FBUS

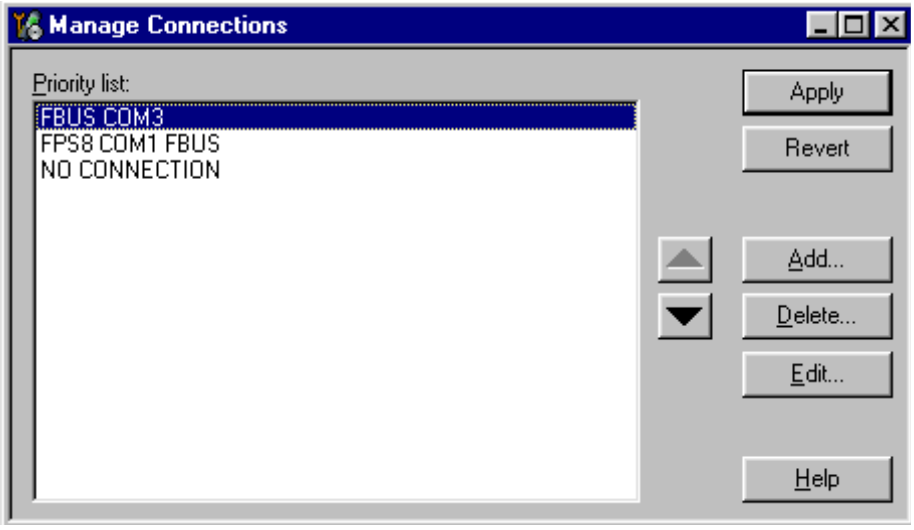
Choose "Finish" to complete.

If you use the Wizard, connect the tools and a phone to your PC and the wizard will automatically try to configure the correct connection.

 Copyright ©Nokia. All rights reserved.

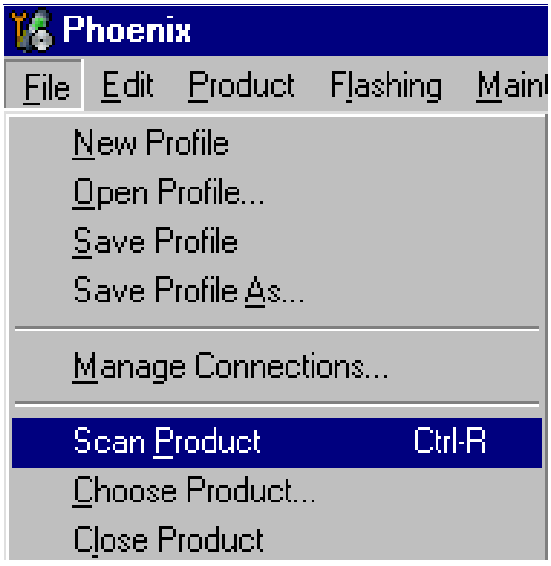
Activate the connection you want to use by clicking it and use up/down arrows to move it on top of the list. Choose "Apply".

The connection is now selected and can be used after closing the "Manage Connections" window.



Selected connection will be shown on the right hand bottom corner of the screen.

To use the selected connection, connect the phone to Phoenix with correct service tools, make sure that it is switched on and select "Scan Product".



When the Product is found, Phoenix will load product support and when everything is ready, name of the loaded product support module and its version will be shown on the bottom of the screen.

Copyright ©Nokia. All rights reserved.

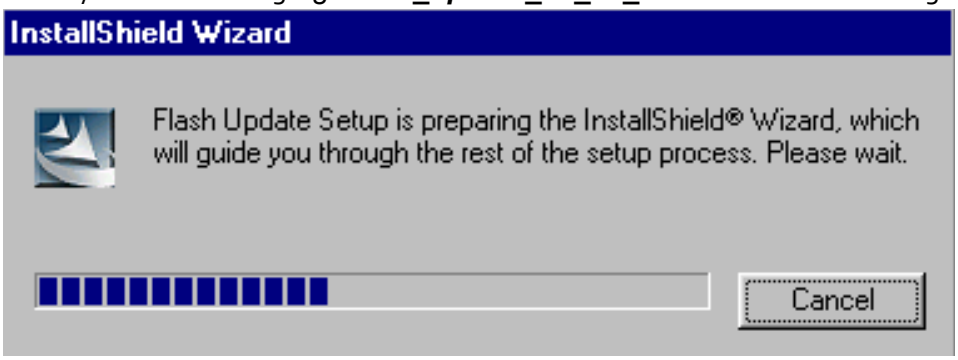
How to Update Flash Support Files for FPS-8* and FLS-4*

Before Installation

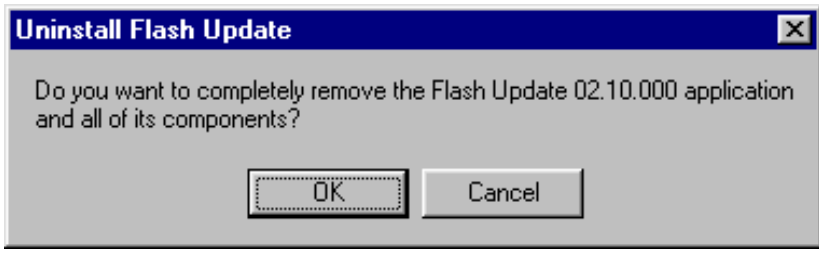
- Install Phoenix Service SW and Phoenix data package.
- Install the phone model Specific Datapackage for Phoenix
- The flash support files are delivered in the same installation package with Phoenix data package.
- Normally it is enough to install the data package only before updating the FPS-8.
- Separate installation package is for flash support files are available, and the files can be updated according to this instruction.

Installing the Flash Support Files

Start by double clicking eg***. flash_update_02_10_00.exe.*** Installation begins.


InstallShield Wizard
Flash Update Setup is preparing the InstallShield® Wizard, which will guide you through the rest of the setup process. Please wait.
Cancel

If you already have the same Flash Update package files installed, you need to confirm if you want them to be reinstalled.

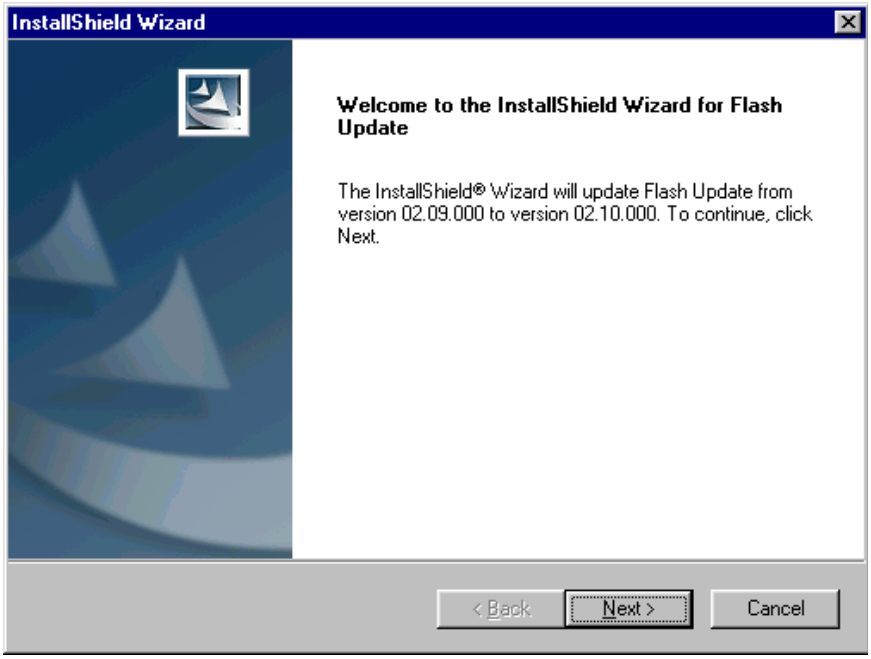

Uninstall Flash Update
Do you want to completely remove the Flash Update 02.10.000 application and all of its components?
OK
Cancel

 Copyright ©Nokia. All rights reserved..

If you try to downgrade the existing version to older ones, the setup will be aborted. If you really want to downgrade, uninstall newer files manually from Control Panel and then rerun the installation again.

You have newer version of the application.
If you want to install older version you need to uninstall the current version before.
Setup will exit.
OK

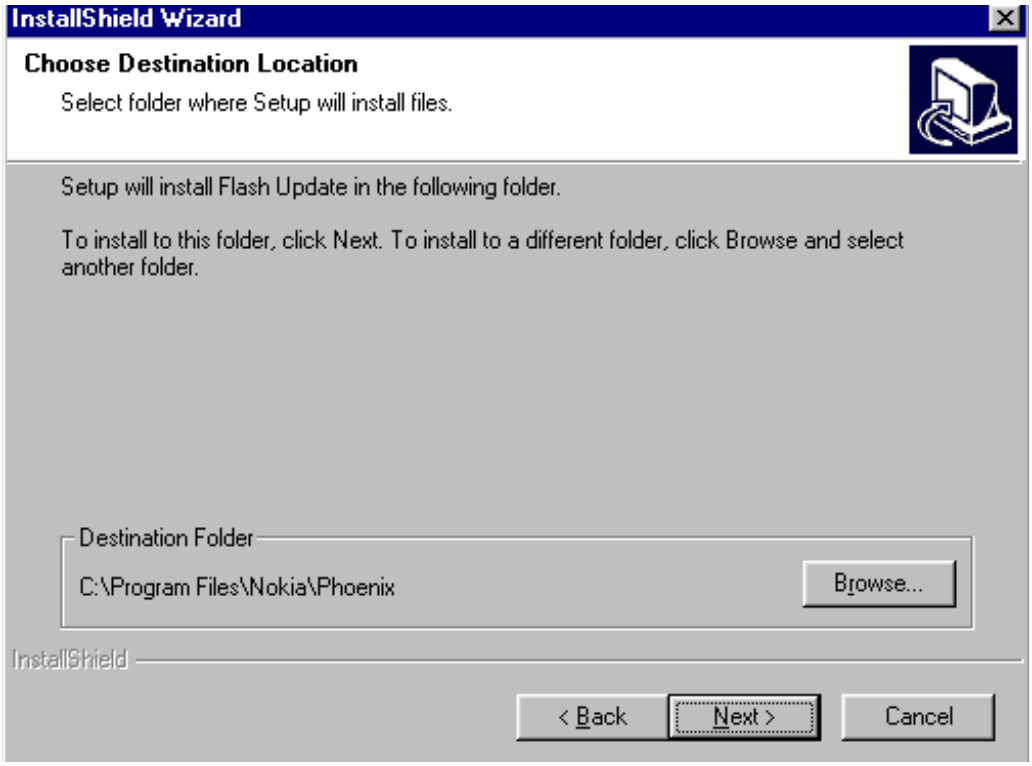
If an older version exists on your PC and it needs to be updated, choose "Next" to continue installation


InstallShield Wizard
Welcome to the InstallShield Wizard for Flash Update
The InstallShield® Wizard will update Flash Update from version 02.09.000 to version 02.10.000. To continue, click Next.
< Back
Next >
Cancel

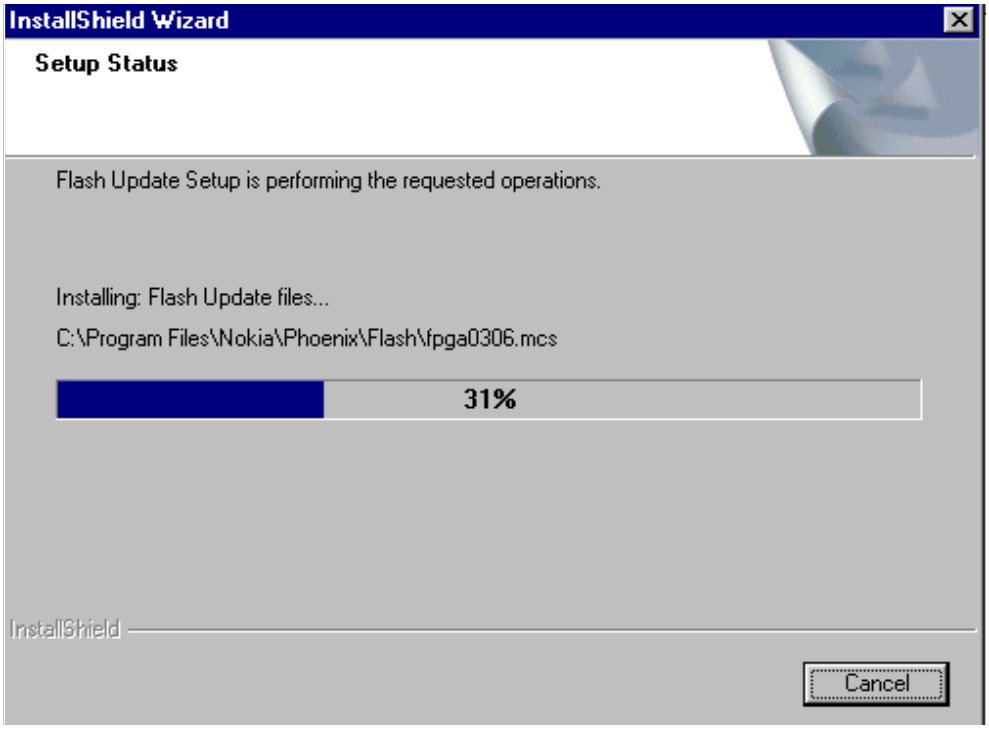
It is **highly** recommended to install the files to the default destination folder ***C:|Program Files|Nokia|Phoenix***.

Copyright ©Nokia. All rights reserved.

Choose "Next" to continue. You may choose another location by selecting "Browse" (not recommended).


InstallShield Wizard
Choose Destination Location
Select folder where Setup will install files.
Setup will install Flash Update in the following folder.
To install to this folder, click Next. To install to a different folder, click Browse and select another folder.
Destination Folder
C:\Program Files\Nokia\Phoenix
Browse...
InstallShield
< Back
Next >
Cancel

Installation continues...

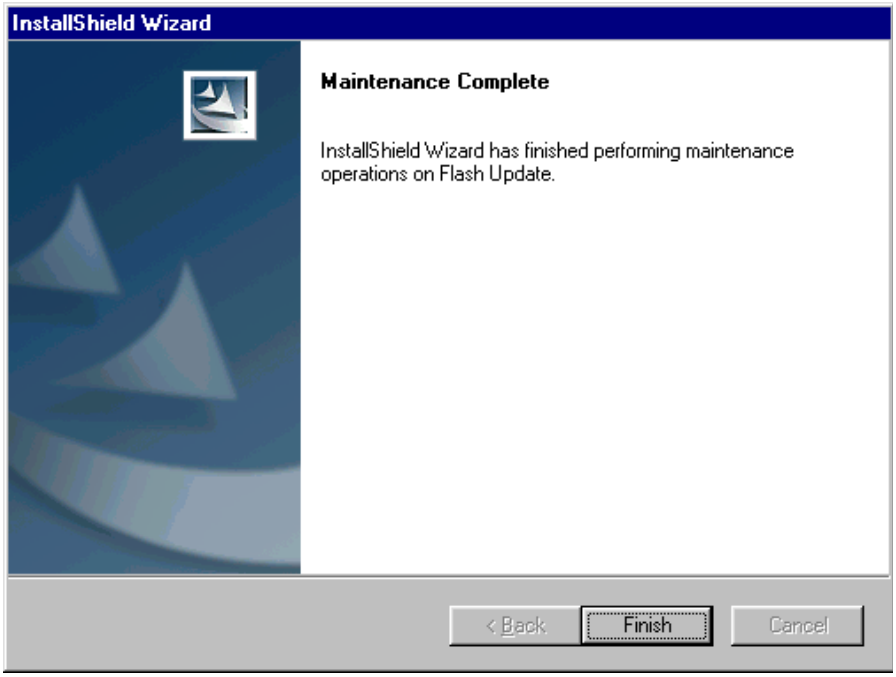


Choose "Finish" to complete procedure.

- **FLS-4 can be used right after Flash Update Package is installed.**

 Copyright ©Nokia. All rights reserved..

- **FPS-8* must be updated by using Phoenix!**

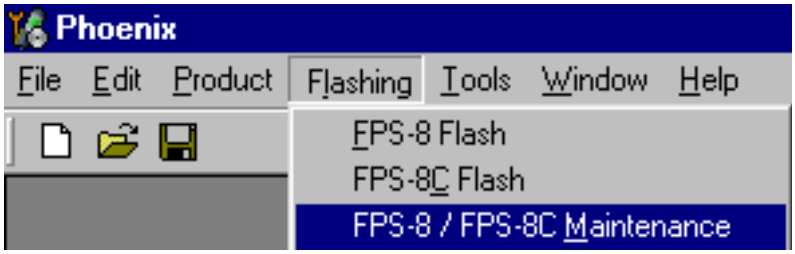


Copyright ©Nokia. All rights reserved.

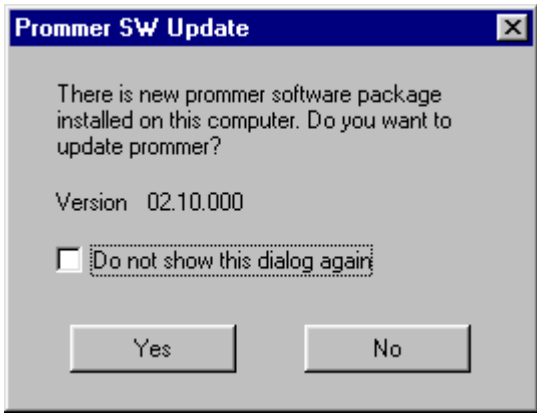
How to Update The FPS-8* Flash Prommer SW

Start Phoenix Service Software

Select"FPS-8 / FPS-8C maintenance" from"Flashing" menu.

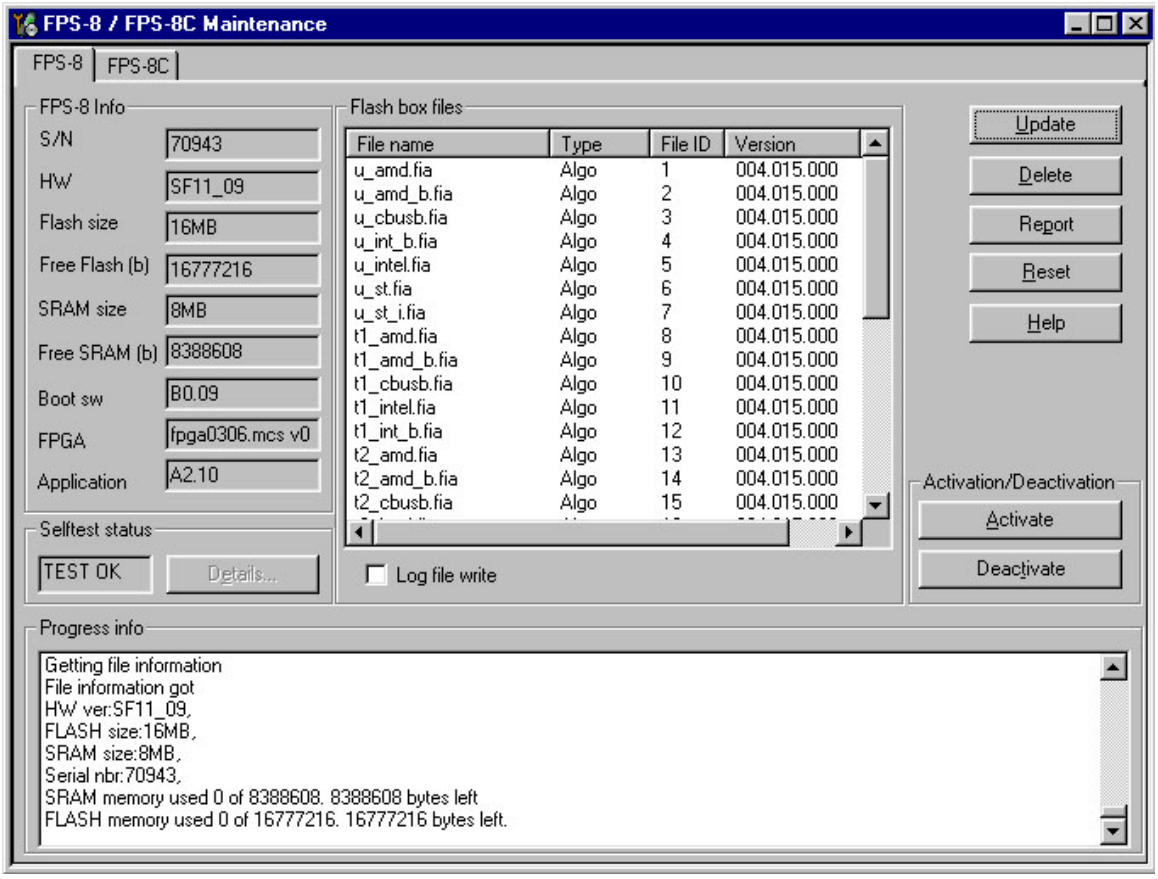


When new FPS-8 flash update package is installed to computer you will be asked to update the files to your FPS-8 Prommer. Select"Yes" to update files..

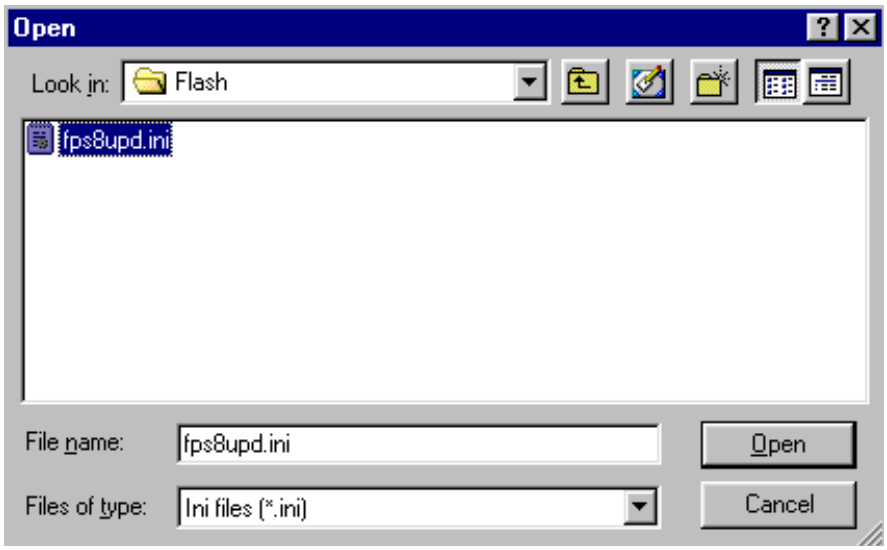

Prommer SW Update
There is new prommer software package installed on this computer. Do you want to update prommer?
Version 02.10.000
Do not show this dialog again
Yes
No

Update procedure takes a couple of minutes.

Copyright ©Nokia. All rights reserved..



FPS-8 sw can also be updated by pressing"Update" button and selecting appropriate **fps8upd.ini** file under ***C:\Program Files\Nokia\Phoenix*\Flash** - directory



All files can be loaded separately to FPS-8. To do this, just press right mouse button in Flash box files" window and select file type to be loaded.

More information and help can be found from the "Help" dialog.

 Copyright ©Nokia. All rights reserved.

FPS-8 Activation and Deactivation

- Before the FPS-8 can be successfully used for phone programming, it must be first activated.
- If there is a need to send FPS-8 box to somewhere e.g. for repair, box must be first deactivated.

Activation

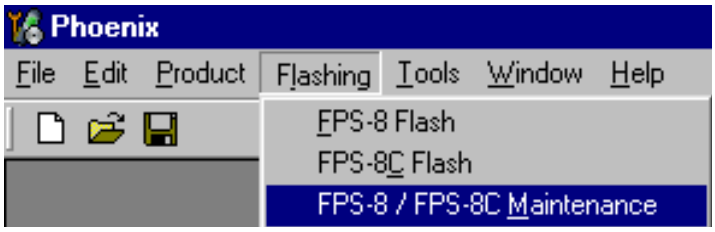
Before FPS-8 can be successfully used for phone programming, it must be first activated.

Fill in first "FPS-8 activation request" sheet, in the FPS-8 sales package and follow the instructions in the sheet.

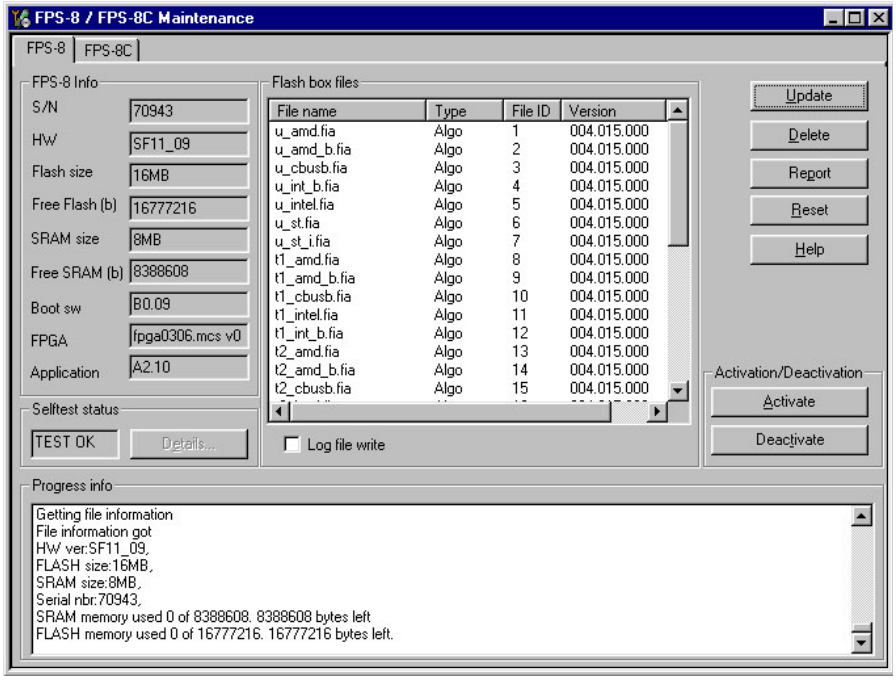
When activation file is received (e.g. 00000.in), copy it to ***C:\Program-Files\Nokia\Phoenix\BoxActivation -*** Directory on your computer (This directory is created when Phoenix is installed).

Start Phoenix Service Software.

Select "FPS-8 / FPS-8C maintenance" from "Flashing" menu.

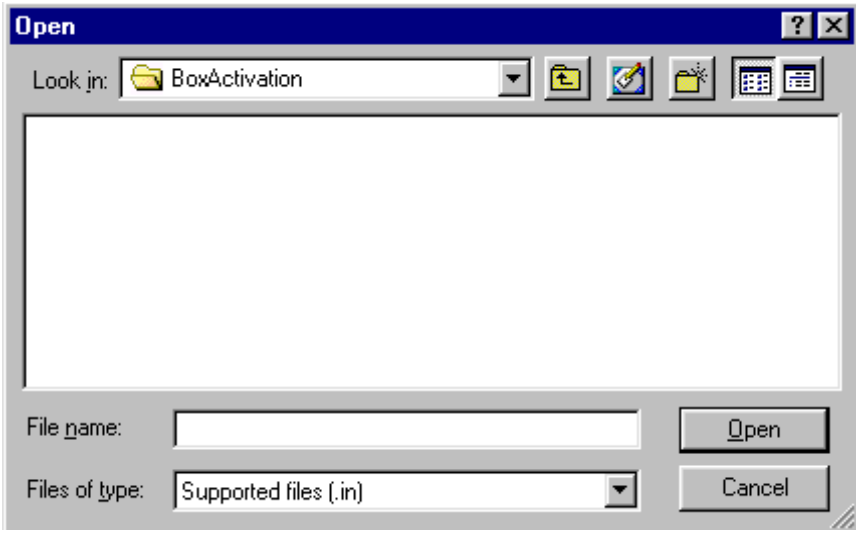


Select "Activate" from the "FPS8/8C Maintenance" – UI.



 Copyright ©Nokia. All rights reserved..

The activation file you saved to *C:\ProgramFiles\Nokia\Phoenix\BoxActivation* - directory will be shown (e.g. 00000.in), check that it is correct.



Box will be activated when you choose "Open"

Turn FPS-8 power off and on to complete activation

Copyright ©Nokia. All rights reserved.

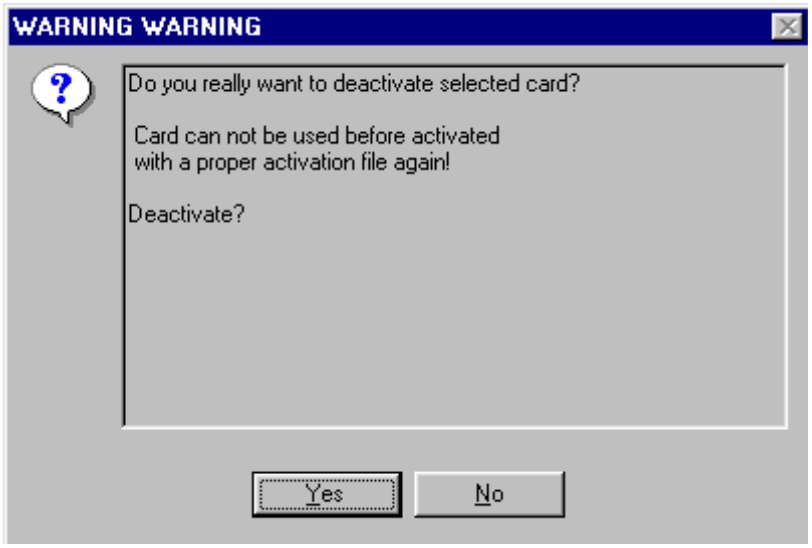
Deactivation

Start Phoenix Service Software.

Select "FPS-8 / FPS-8C maintenance" from "Flashing" menu

Select "Deactivate" from the "FPS8/8C Maintenance" – UI.

Confirm Deactivation by choosing "Yes", Box will be deactivated.



Turn FPS-8 power off and on to complete deactivation

Copyright ©Nokia. All rights reserved..

JBV-1 Docking Station SW

The JBV-1 Docking Station is a common tool for all DCT-4 generation products. In order to make the JBV-1 usable with different phone models, a phone specific Docking Station Adapter is used for different service functions.

The JBV-1 Docking Station contains Software (Firmware) which can be updated.

You need the following equipment to be able to update JBV-1 software:

- PC with USB connection
- Operating System supporting USB (Not Win 95 or NT)
- USB Cable (Can be purchased from shops or suppliers providing PC hardware and accessories)
- JBV-1 Docking Station
- External Power Supply 11-16V

Before Installation

- Download *Jbv1_update.zip* – file to your computer (e.g. C:\TEMP) from your download web site.
- Close all other programs
- Follow instructions on the screen

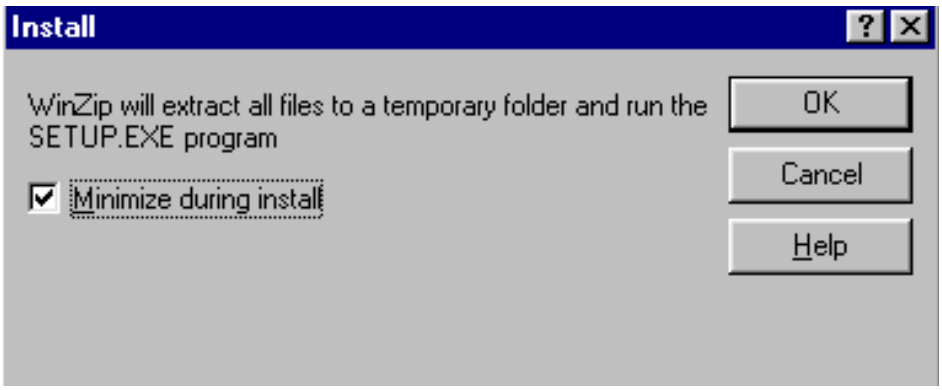
 Copyright ©Nokia. All rights reserved.

Installing SW Needed for the JBV-1 SW Update

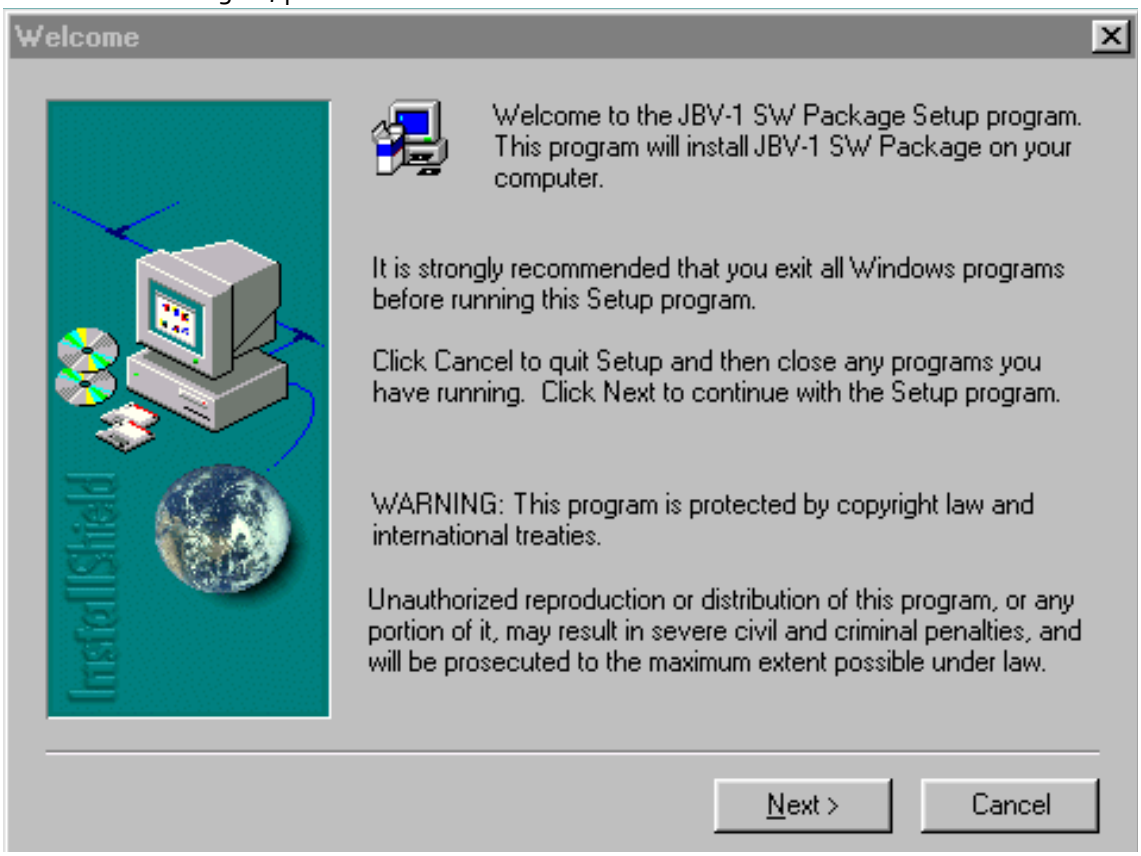
Note: DO NOT CONNECT THE USB CABLE / JBV-1 TO YOUR COMPUTER YET!

Run ***Jbv1_update.zip*** file and start SW Installation by double clicking ***Setup.exe***.

Files needed for JBV-1 Package setup Program will be extracted.



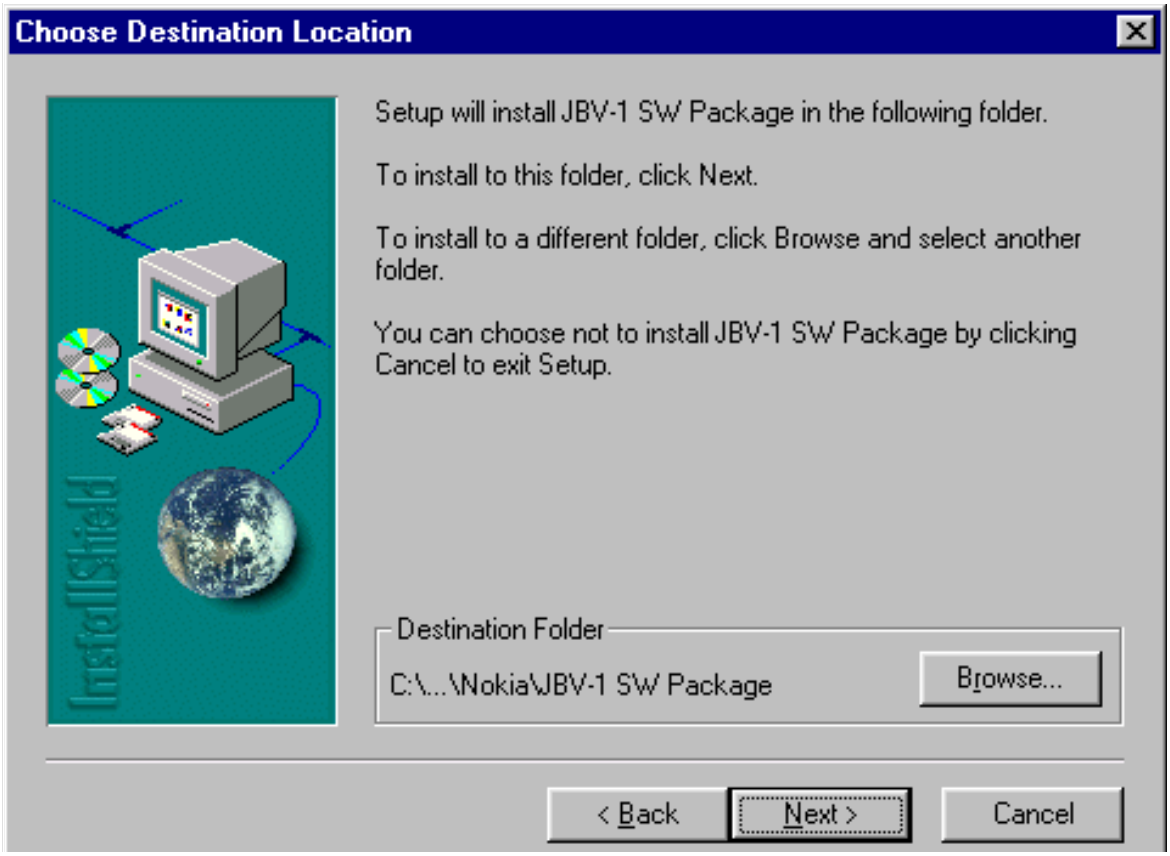
Installation begins, please read the information shown and Choose "Next" to continue.


Welcome
Welcome to the JBV-1 SW Package Setup program. This program will install JBV-1 SW Package on your computer.
It is strongly recommended that you exit all Windows programs before running this Setup program.
Click Cancel to quit Setup and then close any programs you have running. Click Next to continue with the Setup program.
WARNING: This program is protected by copyright law and international treaties.
Unauthorized reproduction or distribution of this program, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under law.
InstallShield
Next >
Cancel

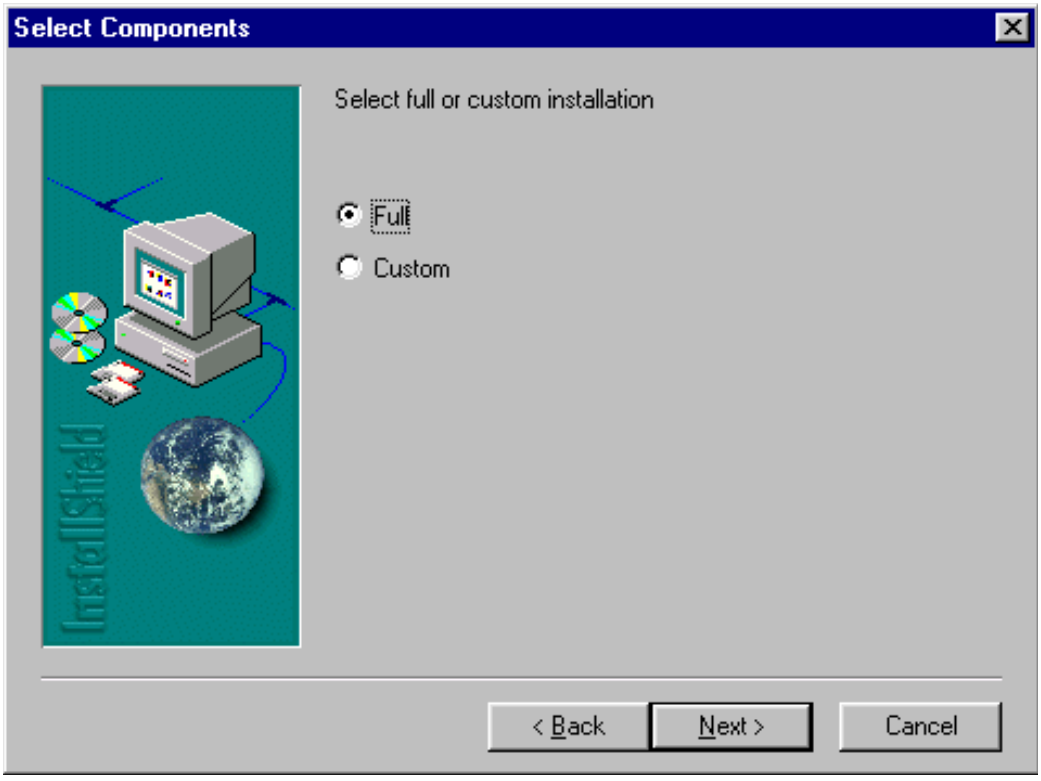
Use suggested destination folder where JBV-1 SW Package will be installed and choose

 Copyright ©Nokia. All rights reserved..

"Next" to continue.


Choose Destination Location
Setup will install JBV-1 SW Package in the following folder.
To install to this folder, click Next.
To install to a different folder, click Browse and select another folder.
You can choose not to install JBV-1 SW Package by clicking Cancel to exit Setup.
InstallShield
Destination Folder
C:\...\Nokia\JBV-1 SW Package
Browse...
< Back
Next >
Cancel

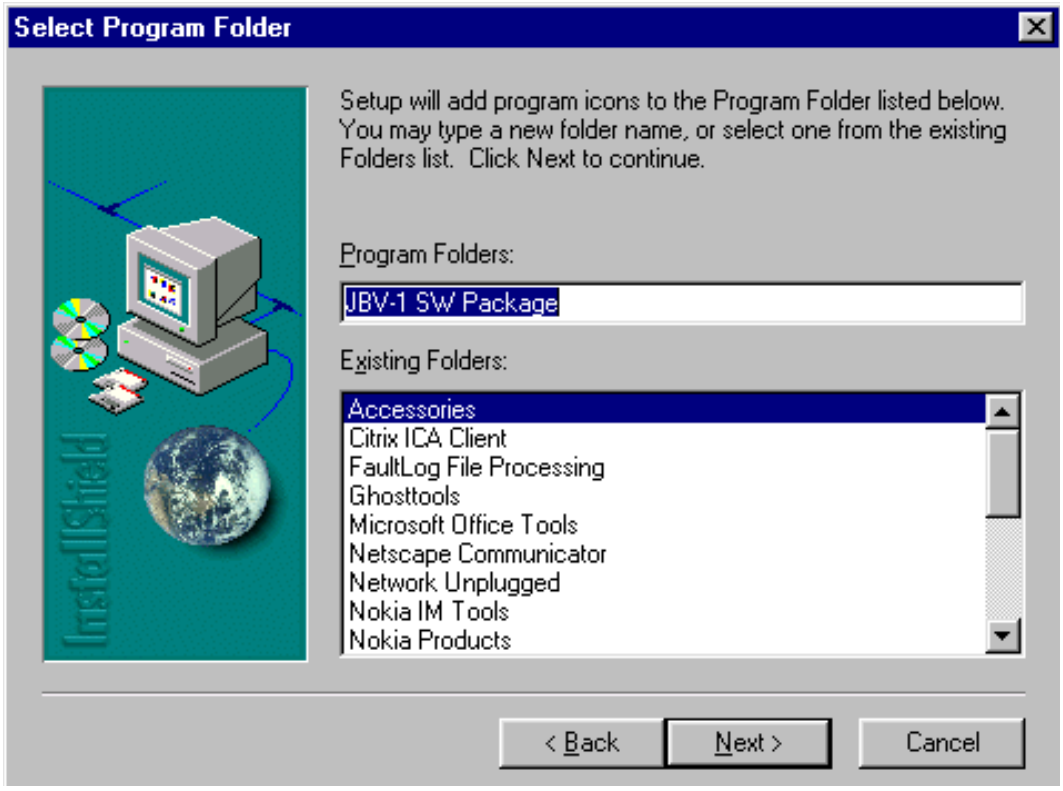
Select "Full" Installation and choose "Next" to continue



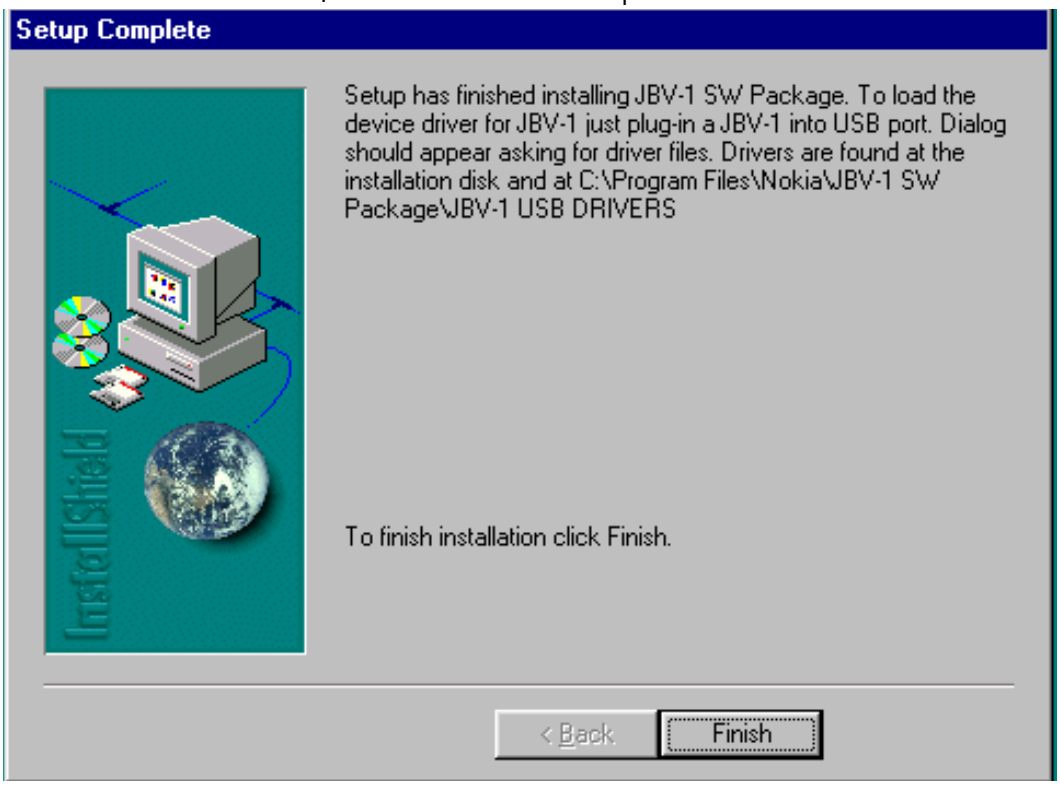
Program Folder will be created. Choose "Next" to continue, Software files will be

 Copyright ©Nokia. All rights reserved.

installed.



After successful installation, choose "Finish" to complete.


Setup Complete
Setup has finished installing JBV-1 SW Package. To load the device driver for JBV-1 just plug-in a JBV-1 into USB port. Dialog should appear asking for driver files. Drivers are found at the installation disk and at C:\Program Files\Nokia\JBV-1 SW Package\JBV-1 USB DRIVERS
To finish installation click Finish.
InstallShield
< Back
Finish

NOW YOU CAN CONNECT THE USB CABLE / JBV-1 TO YOUR COMPUTER!

Connect power to JBV-1 (11-16V DC) from external power supply, then connect USB

 Copyright ©Nokia. All rights reserved..

Cable between JBV-1 USB connector and PC.

Windows will detect connected USB cable and detect drivers for new HW.

Follow the instructions and allow Windows to search and install the best drivers available. After this procedure the actual JBV-1 SW update can begin.

Add New Hardware Wizard
This wizard searches for new drivers for:
USB Device
A device driver is a software program that makes a hardware device work.
< Back
Next >
Cancel

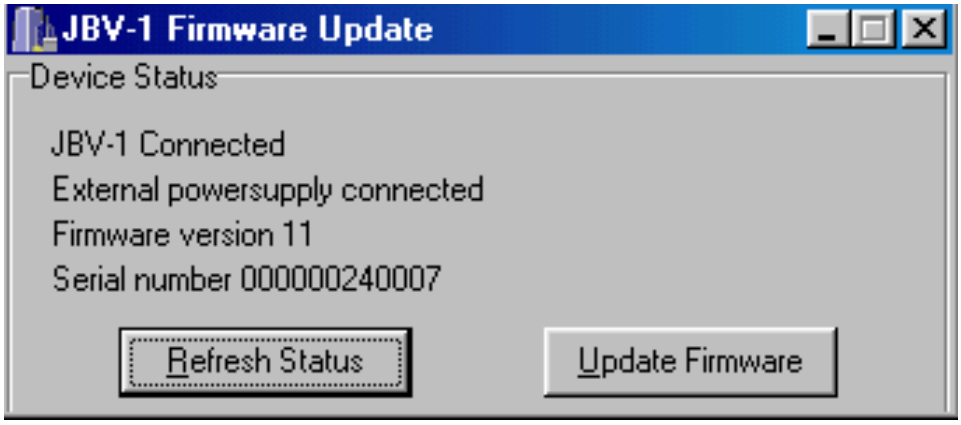
Copyright ©Nokia. All rights reserved.

Updating the JBV-1 Docking Station Software

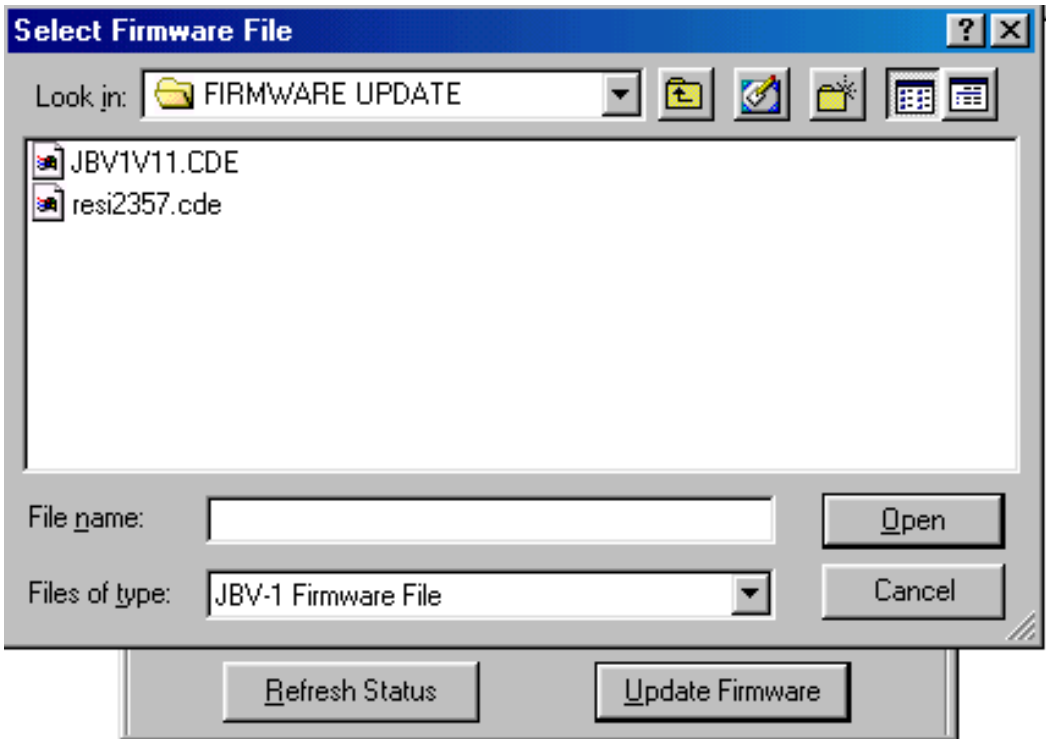
Go to folder *C:\Program Files\Nokia\ JBV-1 SW Package\ FIRMWARE UPDATE* and start JBV-1 Update SW by double clicking *fwup.exe.*

JBV-1 Firmware update starts and shows current status of the JBV-1 connected.

If firmware version read from your JBV-1 is not the latest one available, it needs to be updated by choosing "Update Firmware".



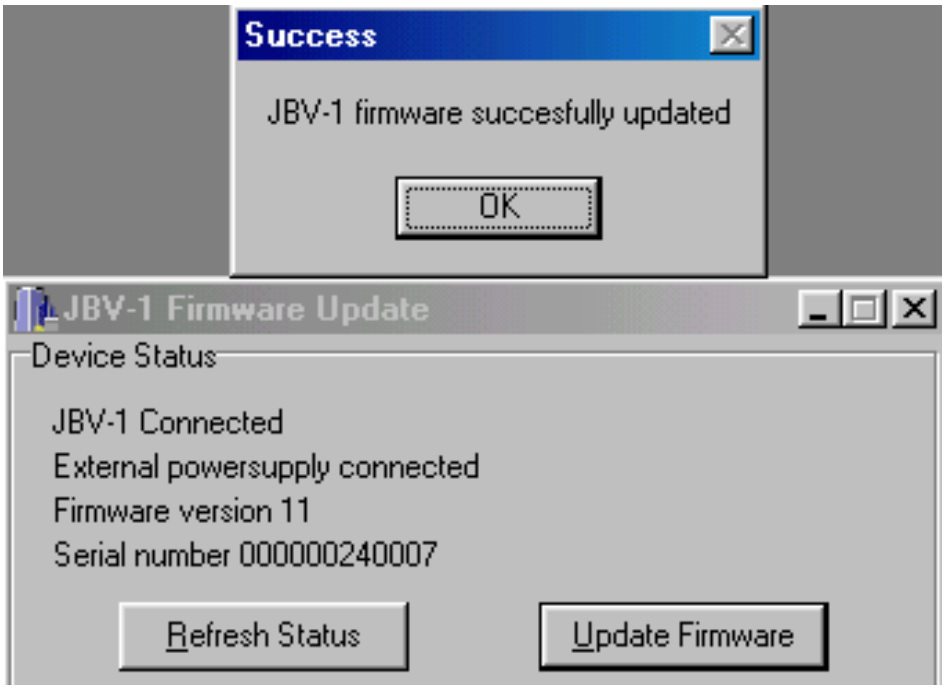
Choose file *JBV1v11.CDE* (example used here is for v 11) and "Open" to update your JBV-1.



After Successful update, current JBV-1 status will be shown. You have now updated the

 Copyright ©Nokia. All rights reserved..

software of your JBV-1 docking station and it is ready for use.



Copyright ©Nokia. All rights reserved.

[This page left intentionally blank]

 Copyright ©Nokia. All rights reserved..

Copyright ©Nokia. All rights reserved.

Quick Guide for Tuning With Phoenix

General remarks

If baseband tunings are needed, they should be completed before the RF tunings.

Avoid unnecessary tuning – factory-tuning values are always the most accurate ones.

Screen shots described in this document may change as the service software is developed.

Kindly refer to the Phoenix help files, the phone model specific service manual and bulletins for help.

Copyright ©Nokia. All rights reserved..

RF Tuning and Calibration Instructions for Iris HDB58

Introduction

This document describes the methods of RF tunings and calibrations for Iris NSB-9 transceiver. RF tunings are made using automatic setup in which Phoenix software controls the phone via FBUS and the measurement equipment via GPIB bus.

Autotune feature is designed to align the product's RF part easier and faster. By this autotune component the product is tuned automatically. Manual tuning is not available.

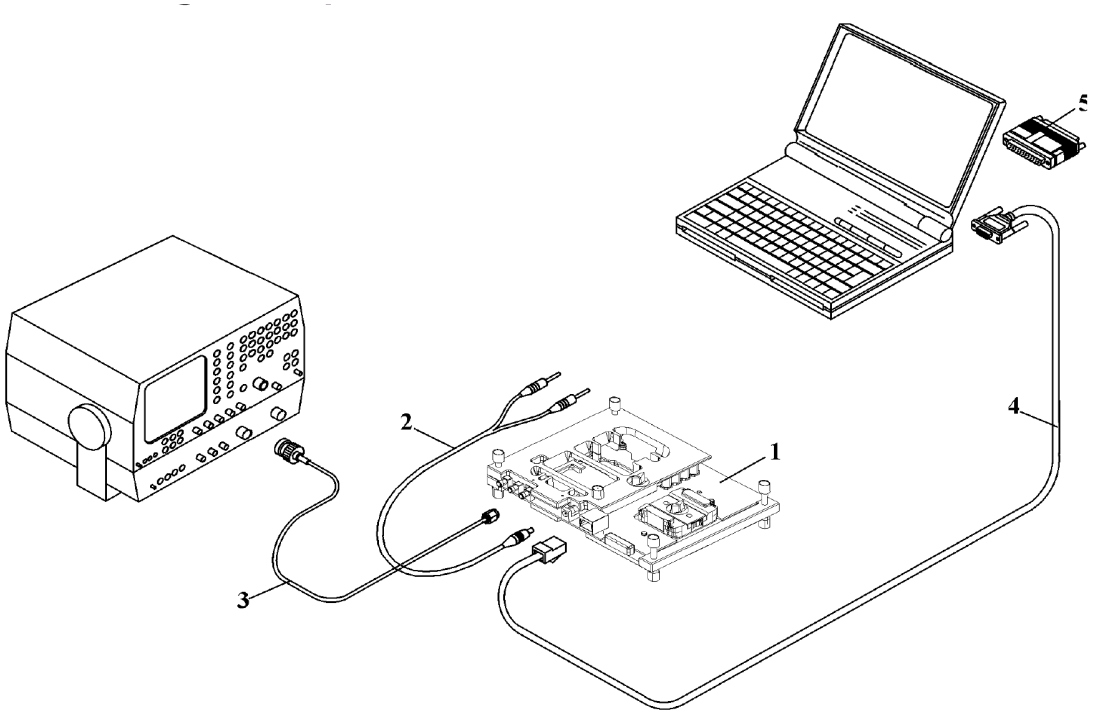
RF tunings must be performed if any RF components are changed. RF tunings shall be done using MJS-48 module jig. MJS-48 jig loss figures can be found from "RF Service Tools" chapter. MJF-32 with a coupler is not allowed to use for RF tuning purpose.

EQUIPMENT NEEDED:

- NSB-9 module jig MJS-48, power- and DAU-9S cables
- DC power supply 3.9 VDC >3A
- Transmitter tester (e.g. Agilent VSA E4406A)
- Signal generator for RX tuning (e.g. Agilent E4433B)
- RF splitter (e.g. Mini-Circuits ZAPD-21)
- 6 dB attenuator, between module jig and RF cable to the splitter (e.g. Suhner)
- PC with GPIB bus adapter, Phoenix software and security dongle (PKD1xx)

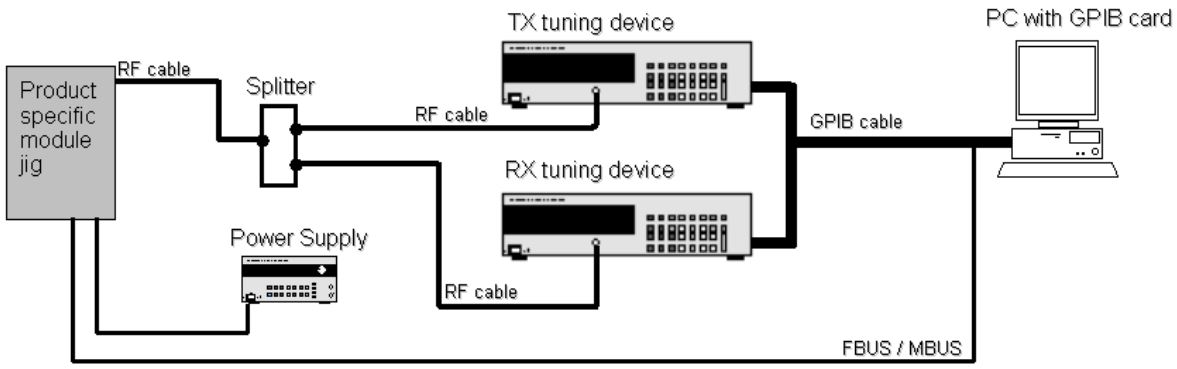
Copyright ©Nokia. All rights reserved.

Figure 1: RF tuning concept



Item	Type	Description	Code
1	MJS-48	Module jig	0770392
2	PCS-1	DC power cable	0730012
3	XRF-1	RF antenna cable	0730085
4	DAU-9S	Service MBUS cable	0730108
5	PKD-1	Software protection key (Dongle)	0750018

Figure 2: Setup environment

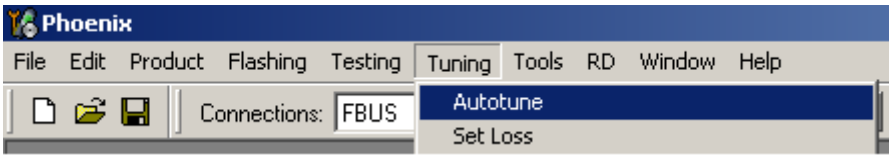


Copyright ©Nokia. All rights reserved..

Autotuning

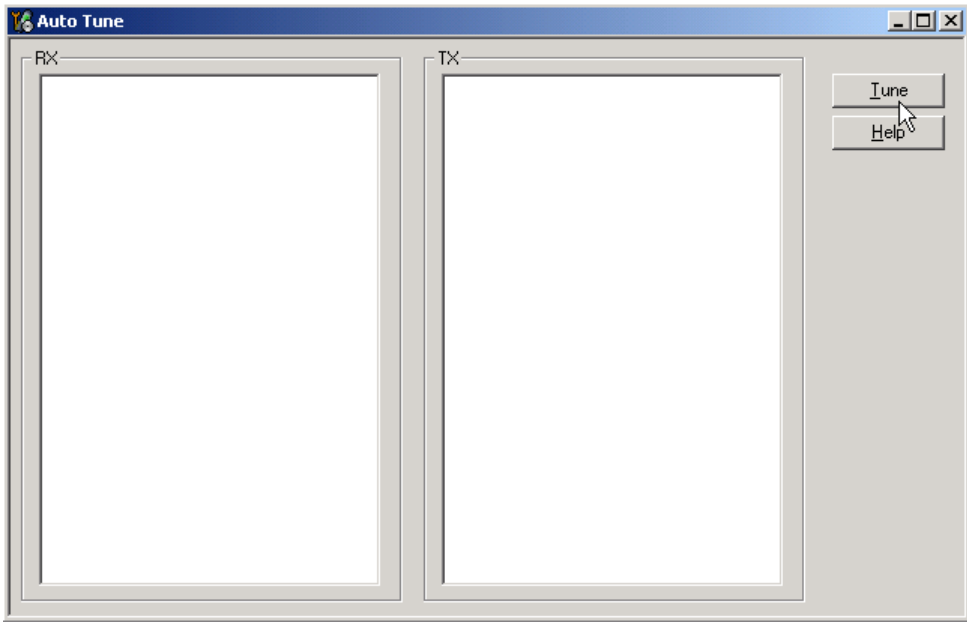
The Autotune component can be found under Tuning menu:

Figure 3: Autotune menu in Phoenix



When tuning, one only needs to click the Tune button to start automatic tuning procedure.

Figure 4: Autotune menu - RX/TX menu

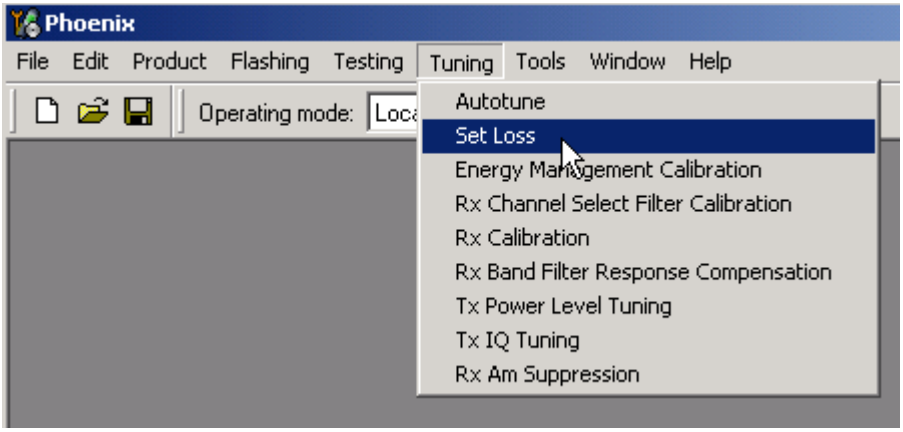


The tuning results are shown in RX and TX windows.

Copyright ©Nokia. All rights reserved.

Set Loss

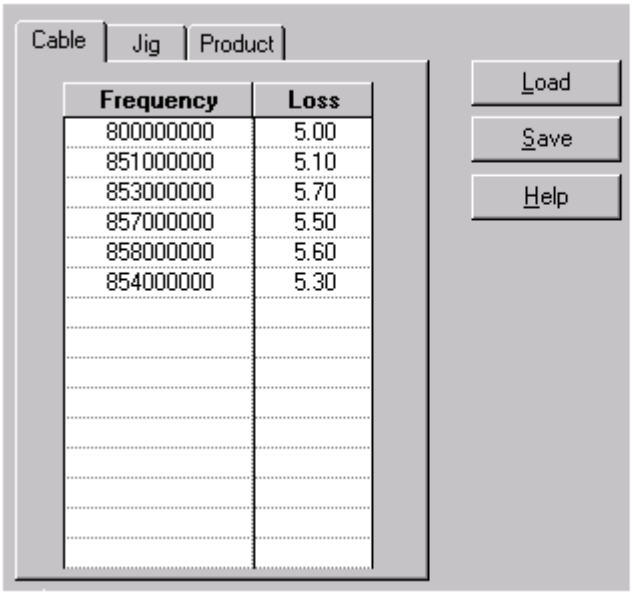
Figure 5: Set Loss menu



This is the component for saving RF-losses (of cables and jigs) to file. These loss values are needed when you tune the phone with Phoenix (using Auto-Tune component). When you measure the losses you have to be very careful, because these values affect directly how well the phone is tuned.

Note! Components are protected by PKD-1CS, PKD-1NS, PKD-1 and PKD-1P dongles using standard TSS protection procedure. Autotuning itself is possible with all these dongles but with PKD-1P and PKD-1 dongles user is not able to set the loss.

Figure 6: Loss values



Copyright ©Nokia. All rights reserved..

RX tunings

Channel Select Filter Calibration

Description

Rx Channel select filter is tuned only in one band. The Hagar RF IC contains tunable filters for the I and Q channels. The calibration of these filters is carried out with a calibration circuit integrated in the IC.

By writing different control words to the Calibration Control Register in Hagar, internal switches will connect various RC combinations between the TXC input line and the RXQ output line.

During the calibration, the DSP generates a 67.71 kHz sine wave on the TXC line and simultaneously receive the measured response from the Hagar on the RXQ line.

Altogether 6 measurements are made. The first measurement is a reference measurement where the TXC signal is routed directly to the RXQ line without going through any filter. The remaining 5 measurements are all done on first order low pass filters with a nominal corner frequency of 67.71 kHz. This means that the received signal on the RXQ line ideally will have an amplitude of 0.707 times the amplitude of the TXC.

Saved tuning values are:

DTOS_I	Calibration of I-channel DtoS collector resistances
DTOS_Q	Calibration of Q-channel DtoS collector resistances
BIQUAD_I_R	Calibration of I-channel filter resistances
BIQUAD_Q_R	Calibration of Q-channel filter resistances
BIQUAD_I_C	Calibration of I-channel filter capacitances
BIQUAD_Q_C	Calibration of Q-channel filter capacitances

Table 1: Channel Select Filter Calibration Limits

Item	Typical value	Low limit *)	High limit *)
DTOS_I	12...18	-6	37
DTOS_Q	12...18	-6	37
BIQUAD_I_R	12...20	-6	37
BIQUAD_Q_R	12...20	-6	37
BIQUAD_I_C	6...16	-6	37
BIQUAD_Q_C	6...16	-6	37

Copyright ©Nokia. All rights reserved.

*) Tuning may return values between -6...37 but values between 0...31 are saved to phone permanent memory. Values -6...0 are round up to 0 and values 31...37 are round down to 31.

RX Calibration

Description

Calibrates 26 MHz voltage controlled reference oscillator VCTCXO at the beginning of GSM850 receiver gain (RSSI) tuning. AFC control voltage for VCTCXO is produced using 11-bits DA-converter inside UEM RF IC. AFC DAC value (AFC VALUE) which gives correct VCTCXO output frequency is defined by measuring RX I/Q signal frequency and by adjusting AFC to set correct frequency. AFC VALUE is used as an init value when phone has not found a base station signal yet.

After correct AFC VALUE is found, AFC value is changed to different value. RX I/Q frequency is measured again and AFC SLOPE (frequency change divided by AFC value change) is calculated.

GSM850 and GSM1900 RX chains gain are tuned at middle channel.

Table 2: RX Calibration Limits

Band	GSM850			GSM1900		
Item	Typical value	Low limit	High limit	Typical value	Low limit	High limit
AFC VALUE	-300...0	-350	350	NA	NA	NA
AFC SLOPE	240...260	150	350	NA	NA	NA
RSSI 0	74...76	65	85	67...71	59	79
RSSI 1	84...86	75	95	77...81	69	89
RSSI 2	94...96	85	105	87...91	79	99
RSSI 3	101...103	91	111	96...99	88	108
RSSI 4	111...113	101	121	106...129	98	118
RSSI 5	121...123	111	131	116...119	108	128
RSSI 6	131...133	121	141	126...129	118	138
RSSI 7	141...143	131	151	136...139	128	148
RSSI 8	151...153	141	161	146...149	138	158

RX AM Suppression Calibration

Description

Calibrates GSM850 and GSM1900 RX mixer local signal DC-levels to achieve best rejection for AM modulated interferences. Calibration needs external AM modulated signal applied to the phone. If tuning is successful, either LOP or LOM result in both branch (I

Copyright ©Nokia. All rights reserved..

and Q) has always zero value.

Saved tuning values are:

LOP_I	Calibration of Rx lower or upper band I channel positive lo bias
LOM_I	Calibration of Rx lower or upper band I channel negative lo bias
LOP_Q	Calibration of Rx lower or upper band Q channel positive lo bias
LOM_Q	Calibration of Rx lower or upper band Q channel negative lo bias

AM Suppression Calibration Limits

Band	GSM850			GSM1900		
Item	Typical value	Low limit	High limit	Typical value	Low limit	High limit
RSSI	-110...-85	-140	-80	-110...-90	-140	-80
LOP_I *)	0...1023	0	1023	0...1023	0	1023
LOM_I *)	0...1023	0	1023	0...1023	0	1023
LOP_Q *)	0...1023	0	1023	0...1023	0	1023
LOM_Q *)	0...1023	0	1023	0...1023	0	1023

*) 10-bits LOP/LOM results may also be introduced in two separate 5-bits results. Then limits are 0 and 31 for each item.

RX Band Filter Response Compensation

Description

Calibrates GSM850 and GSM1900 RX chain gain over whole band. Calibration needs external signal applied to the receiver. Calibration is done in 9 frequencies.

Table 3: RX Band Filter Response Compensation Limits

Band	GSM850			GSM1900		
Item (850/1900)	Typical value	Low limit	High limit	Typical value	Low limit	High limit
ch 118 / 496	-2.6 ... -1.3	-10	5	-1.9 ... +0.5	-10	5
ch 128 / 512	-1.3 ... -0.3	-5	5	-0.3 ... +0.8	-5	5
ch 140 / 537	-0.4 ... +0.3	-5	5	0.0 ... +1.0	-5	5
ch 172 / 586	+0.3 ... +0.9	-5	5	+0.4 ... +1.1	-5	5

Copyright ©Nokia. All rights reserved.

ch 190 / 661	+0.5 ... +1.0	-5	5	+0.4 ... +0.9	-5	5
ch 217 / 736	+0.1 ... +0.7	-5	5	-0.3 ... +0.3	-5	5
ch 241 / 794	-0.7 ... -0.1	-5	5	-0.9 ... 0.0	-5	5
ch 251 / 810	-1.2 ... -0.3	-5	5	-1.0... 0.0	-5	5
ch 261 / 835	-1.8 ... -0.8	-10	5	-2.1 ... -0.7	-10	5

Copyright ©Nokia. All rights reserved..

TX tunings

Tx Power Level Tuning

Calibrates GSM850 and GSM1900 TX power at middle channel. Power control loop keeps TX power same in all channels. Tuning is done at 4 power levels - other values can be linearized using these points.

GSM850				GSM1900			
Power Level	**Target value**	**Tuning target**	**Testing limits *)**	**Power Level**	**Target value**	**Tuning target**	**Testing limits *)**
5	32.5	+/- 0.1	+0.2 / -0.5	0	29.5	+/- 0.1	+0.2 / -0.5
6	31	+/- 0.5	+/- 1	1	28	+/- 0.5	+/- 1
7	29	+/- 0.5	+/- 1	2	26	+/- 0.5	+/- 1
8	27	+/- 0.5	+/- 1	3	24	+/- 0.5	+/- 1
9	25	+/- 0.5	+/- 1	4	22	+/- 0.5	+/- 1
10	23	+/- 0.5	+/- 1	5	20	+/- 0.5	+/- 1
11	21	+/- 0.5	+/- 1	6	18	+/- 0.5	+/- 1
12	19	+/- 0.5	+/- 1	7	16	+/- 0.5	+/- 1
13	17	+/- 0.5	+/- 1.5	8	14	+/- 0.5	+/- 1
14	15	+/- 0.5	+/- 1.5	9	12	+/- 0.5	+/- 1.5
15	13	+/- 0.5	+/- 1.5	10	10	+/- 0.5	+/- 1.5
16	11	+/- 0.5	+/- 1.5	11	8	+/- 0.5	+/- 1.5
17	9	+/- 0.5	+/- 1.5	12	6	+/- 0.5	+/- 1.5
18	7	+/- 1	+/- 2	13	4	+/- 0.5	+/- 1.5
19	5	+/- 1	+/- 2	14	2	+/- 1	+/- 2
Base	-30	+/- 5	+/- 10	15	0	+/- 1	+/- 2
				Base	-30	+/- 5	+/- 10

*) This tolerance shall be used only for tuning channel (middle channel) at +25°C temperature.

Copyright ©Nokia. All rights reserved.

TX IQ Tuning

Calibrates GSM850 and GSM1900 TX I/Q signal DC-offset, amplitude and phase difference at middle channel. Tuning is done by sending '1'-bits to the modulator. Best modulator balance is achieved when spikes at carrier frequency f0 and f0+67.71 kHz reach minimum value.

Saved tuning values are:

TX I-channel DC-offset

TX Q-channel DC-offset

Amplitude difference between TX I- and Q-channels

Phase difference between TX I- and Q-channels

Tuning correctness is checked by measuring TX output spectrum at frequencies:

TX IQ f0

TX IQ f0 + 67.71 kHz

Table 4: TX IQ Tuning Limits

Band	GSM850			GSM1900		
Item	**Typical value**	**Low limit**	**High limit**	**Typical value**	**Low limit**	**High limit**
TX I DC offset	-2...1	-6	6	-3...1	-6	6
TX Q DC offset	-2...1	-6	6	-1.5 ... 2	-6	6
Amplitude difference	-0.3 ... 0.2	-1	1	-0.5 ... 0.1	-1	1
Phase difference	88...92	84	96	90.5 ... 95.5	86	100
TX IQ f0	-55 ... -32	-90	-30	-49 ... -34	-90	-30
TX IQ f0 + 67.71 kHz	-68 ... -48	-90	-35	-63 ... -40	-90	-35

Copyright ©Nokia. All rights reserved..

Service Tool Concept For Baseband Tuning Operations

EM calibrations should be carried out in JBV-1 Docking Station equipped with MJF-32 Docking Station Adapter

Power to JBV-1 should be supplied from an external DC power suply, not FPS-8 prommer

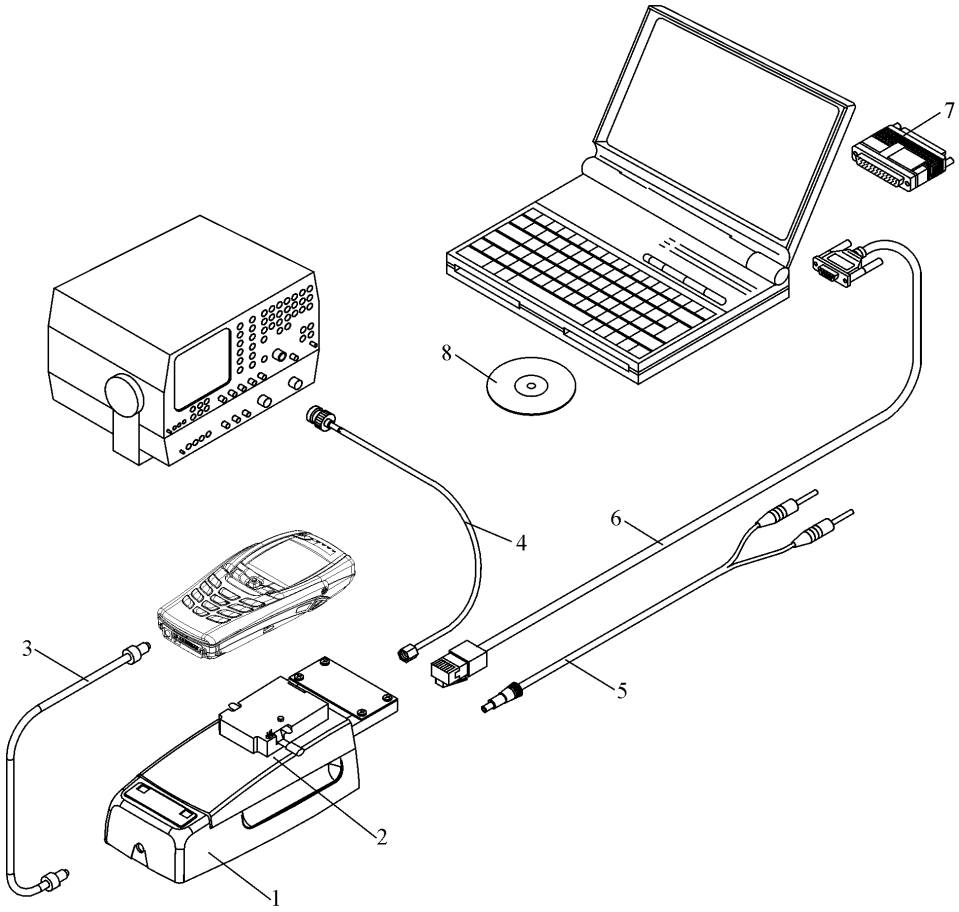
JBV-1 input voltages:

Maximum + 16 VDC

Nominal input for BB tunings is +12 V DC.

Copyright ©Nokia. All rights reserved.

Service Concept for NSB-9 Baseband tunings



Item:	Service accessory:	Type:	Product code:
1	Docking station	JBV-1	0770298
2	Docking station adapter	MJF-32	0770528
3	DC-DC cable	SCB-3	0730114
4	RF antenna cable	XRF-1	0730085
5	DC power cable	PCS-1	0730012
6	Service MBUS cable	DAU-9S	0730108
7	Software protection key	PKD-1	0750018
8	Phoenix Service SW		8409031
	Phoenix Service SW	CD-ROM	0775311
	NSB-9 Flash SW data		8415951
	NSB-9 Flash SW data	CD-ROM	0775344

Copyright ©Nokia. All rights reserved..

Baseband Tuning operations

Energy Management Tuning

External power supply needed.

EM Calibration is used for calibrating Battery and Charger settings of the phone.

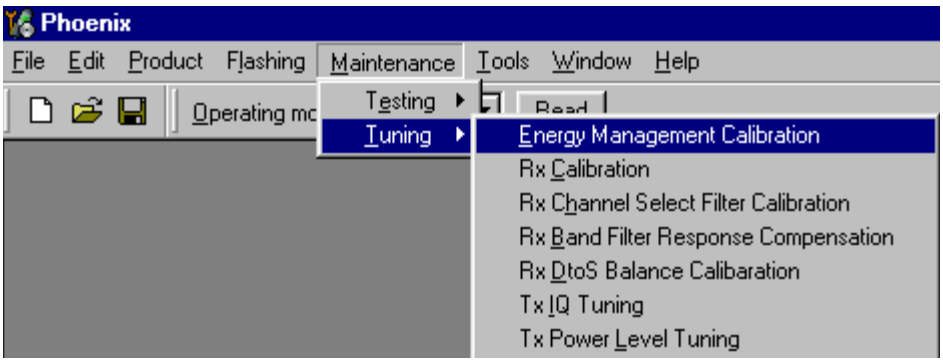
Preparation for EM Calibration:

- Connect DC Cable SCB-3 between JBV-1 and charger socket of Phone for Charger calibration.

- Connect 12...15 V from Power Supply to JBV-1.

- NOTE! Check that connection is F-BUS (does not work with M-BUS!).

Select Maintenance => Tuning => Energy Management Calibration.

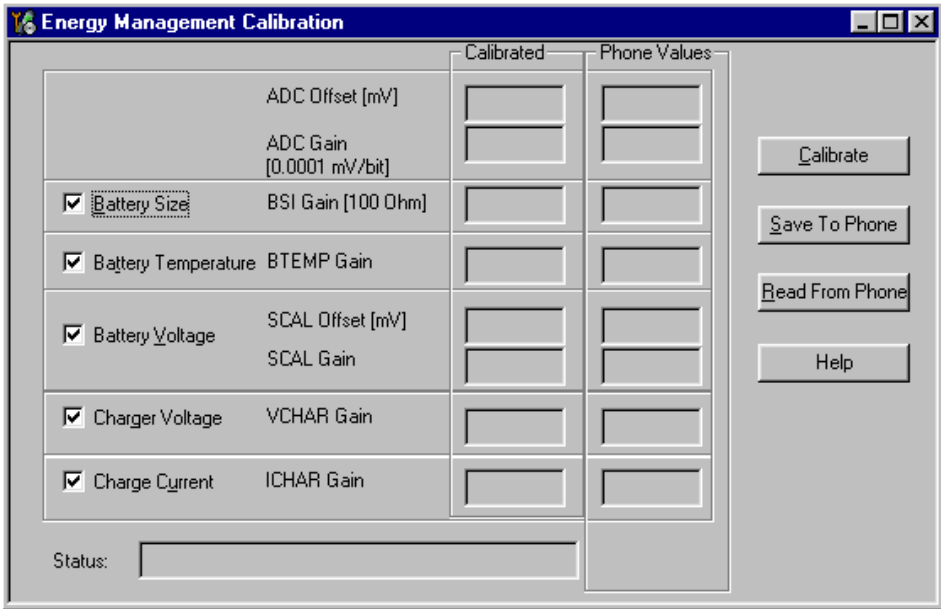


Energy Management values to be calibrated are checked.

Select "Read from Phone" to show the current values in the phone memory and to check that the communication with the phone works.

Copyright ©Nokia. All rights reserved.

Select "Calibrate" to run the selected calibrations.



Limits for Energy Management Calibration:

Parameter	Min.	Max	Note
ADC gain	25400	29000	VBatt, BSI, BTemp
DC offset	-100	100	ADC voltage offset
BSI gain	860	1180	ADC BSI calibration gain
BTEMP gain	1980	2280	ADC BTEMP calibration gain
VBAT gain	10000	11000	ADC VBATT Voltage gain
VBAT offset	2300	2700	ADC VBATT Voltage offset scale
VCHAR	58000	62000	Charge voltage
ICHAR	4050	4900	charge current

If values shown are within limits select "Save To Phone" to save the values in the phone.

NOTE! Only the values of the checked tunings (Battery size, Battery Temperature etc...) are saved.

Close the "Energy Management Calibration" – dialog to end tuning.

You must manually switch the phone on after exiting "Energy Management Calibration" – dialog.

Copyright ©Nokia. All rights reserved..

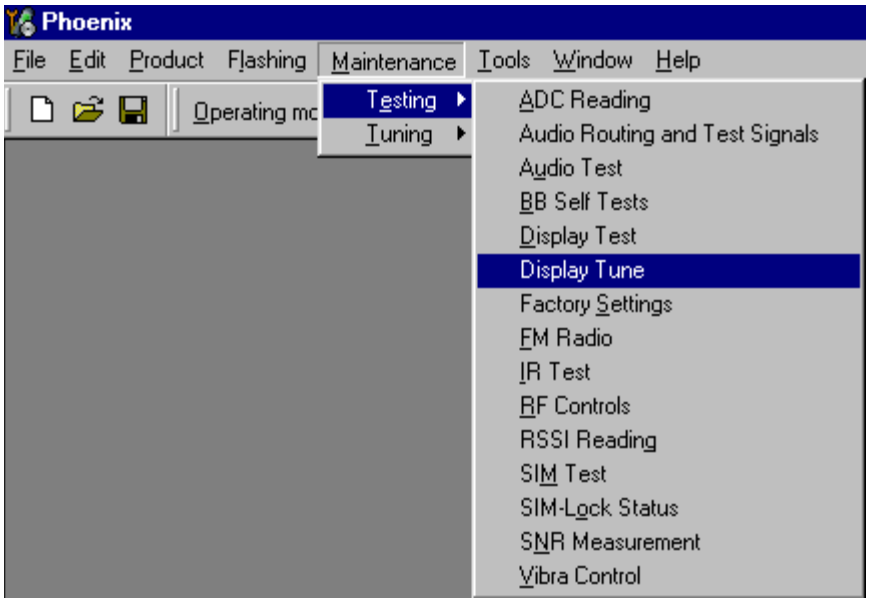
LCD Contrast Tuning

Extra equipment not needed.

This function is used to calibrate the LCD Contrast (brightness).

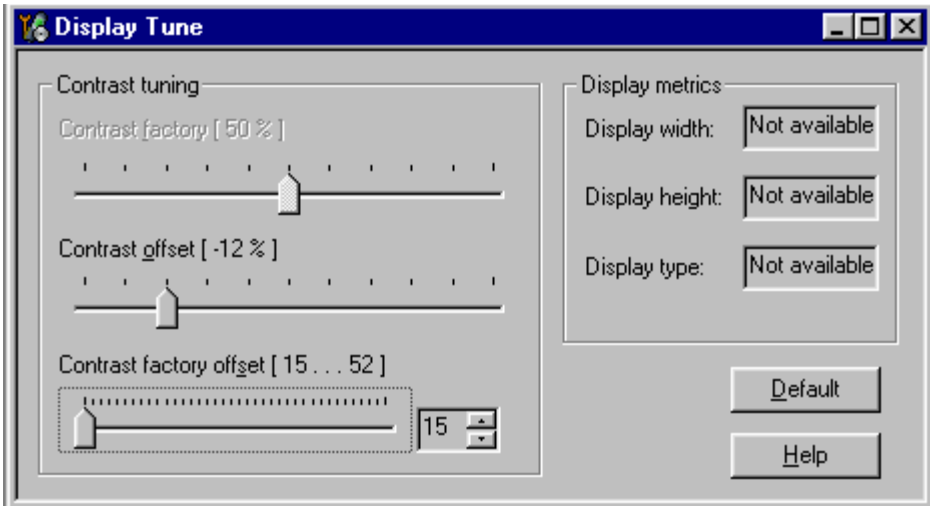
Must be done when LCD module is changed and there is considerable difference in the contrast.

Select Maintenance => Testing => Display Tune



Move the Contrast factory offset slider to reach good LCD contrast.

Both sliders are relative. The Default button resets the bottom Contrast factory offset slider to default value 41. The Contrast offset slider should always be set to 0% (middle of the scale), because that setting is visible on the phone screen.



Close the"Display tune" dialog to end tuning. The tuned values are saved automatically.

Copyright ©Nokia. All rights reserved.

Flashing Setup Instructions

POS (Point of Sale) Flash Concept

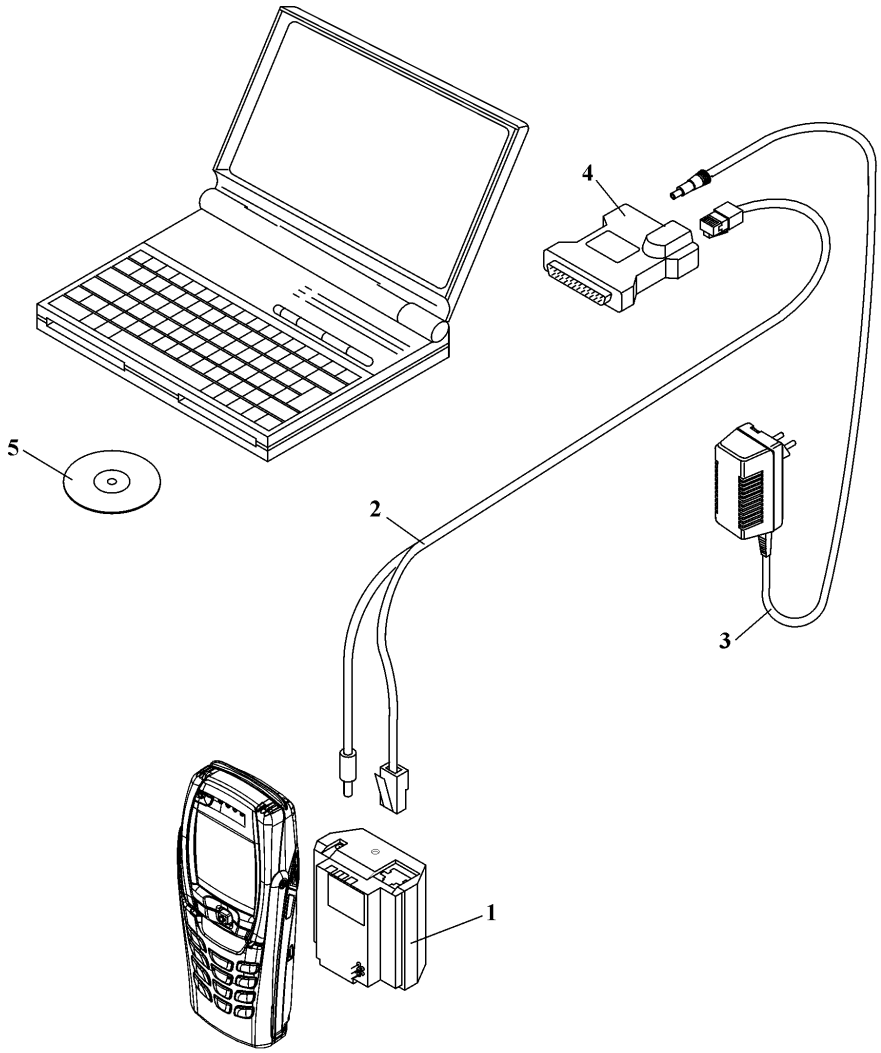


Figure 1: POS flash

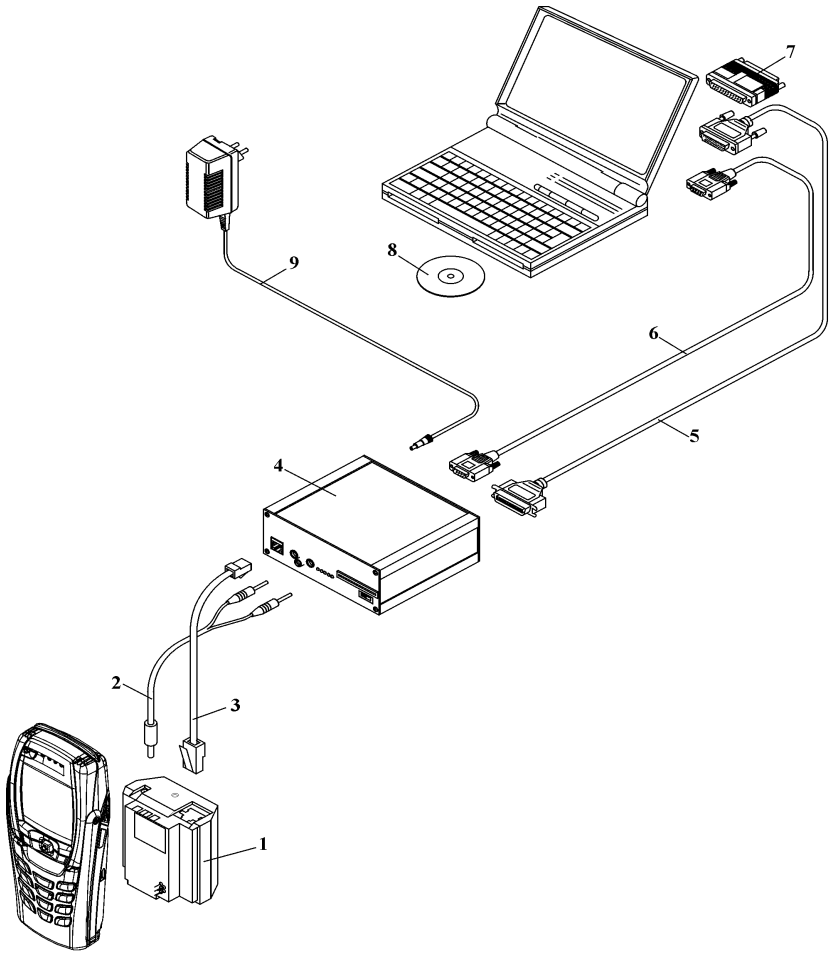
Item	Type	Description	Code
1	FLA-29	Point Of sales flash loading adapter	0775306
2	XCS-1	Service cable	0730218
3	ACF-8	AC Charger	0680032
4	FLS-4S	POS flash dongle, for Americas area	0080543
5	Phoenix Service SW		8409031
	Phoenix Service SW	CD-ROM	0775311

Copyright ©Nokia. All rights reserved..

Item	Type	Description	Code
	NSB-9 Flash SW data		8415951
	NSB-9 Flash SW data	CD-ROM	0775344

Copyright ©Nokia. All rights reserved.

Flash Concept with flashing adapter



Item	Type	Description	Code
1	FLA-29	Point of sales flash loading adapter	0775306
2	FLC-2	Power cable	0730185
3	XCS-4	Modular cable	0730178
4	FPS-8	Flash prommer box	0080321
5		Centronics (printer) cable, incl. in FPS-8 slaes package	0730029
6	AXS-4	RS-232 (D9-D9) cable, incl. in FPS-8 sales package	0730090
7	PKD-1	Software protection key (Dongle)	0750018
8	Phoenix Service SW		8409031
	Phoenix Service SW	CD-ROM	0775311

Copyright ©Nokia. All rights reserved..

Item	Type	Description	Code
	NSB-9 Flash SW data		8415951
	NSB-9 Flash SW data	CD-ROM	0775344
9	ACF-8	AC-charger, incl. in FPS-8 sales package	0680032

Copyright ©Nokia. All rights reserved.

Module Jig Concept

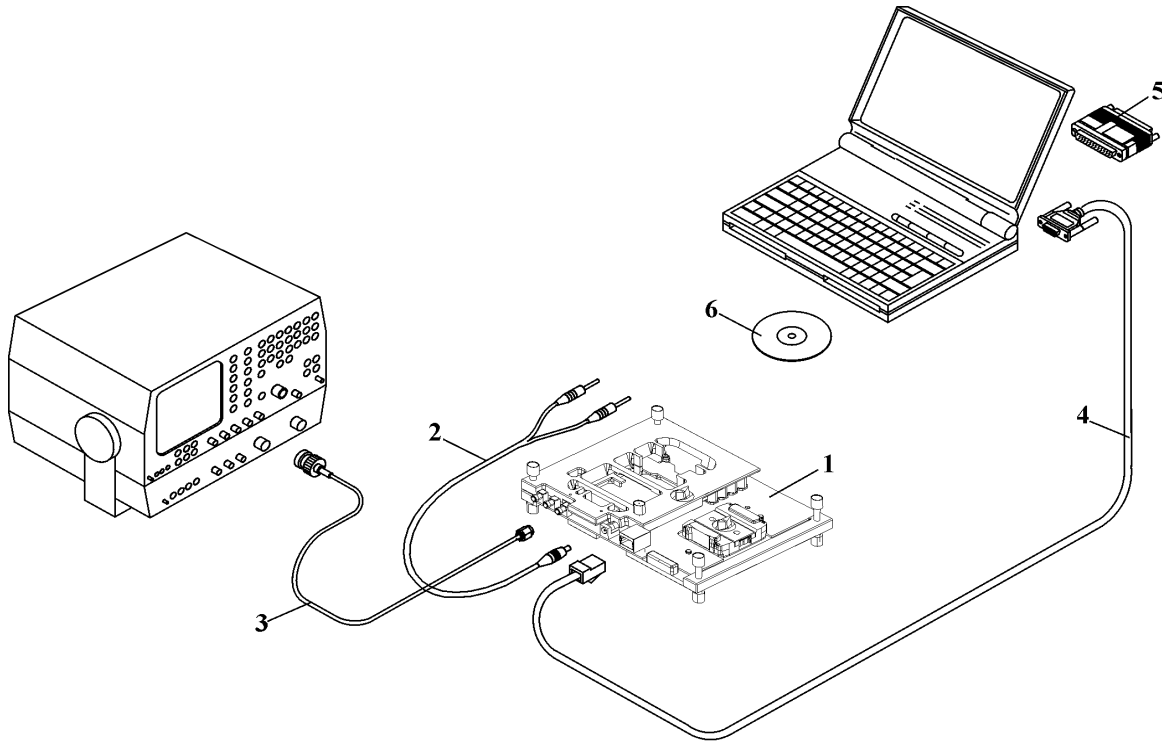


Figure 2: Module jig concept

Item	Type	Description	Code
1	MJS-48	Module jig	0770392
2	PCS-1	DC power cable	0730012
3	XRF-1	RF antenna cable	0730085
4	DAU-9S	Service MBUS cable	0730108
5	PKD-1	Software protection key (Dongle)	0750018
6	Phoenix Service SW		8409031
	Phoenix Service SW	CD-ROM	0775311
	NSB-9 Flash SW data		8415951
	NSB-9 Flash SW data	CD-ROM	0775344

 Copyright ©Nokia. All rights reserved..

JBV-1 Flash Concept

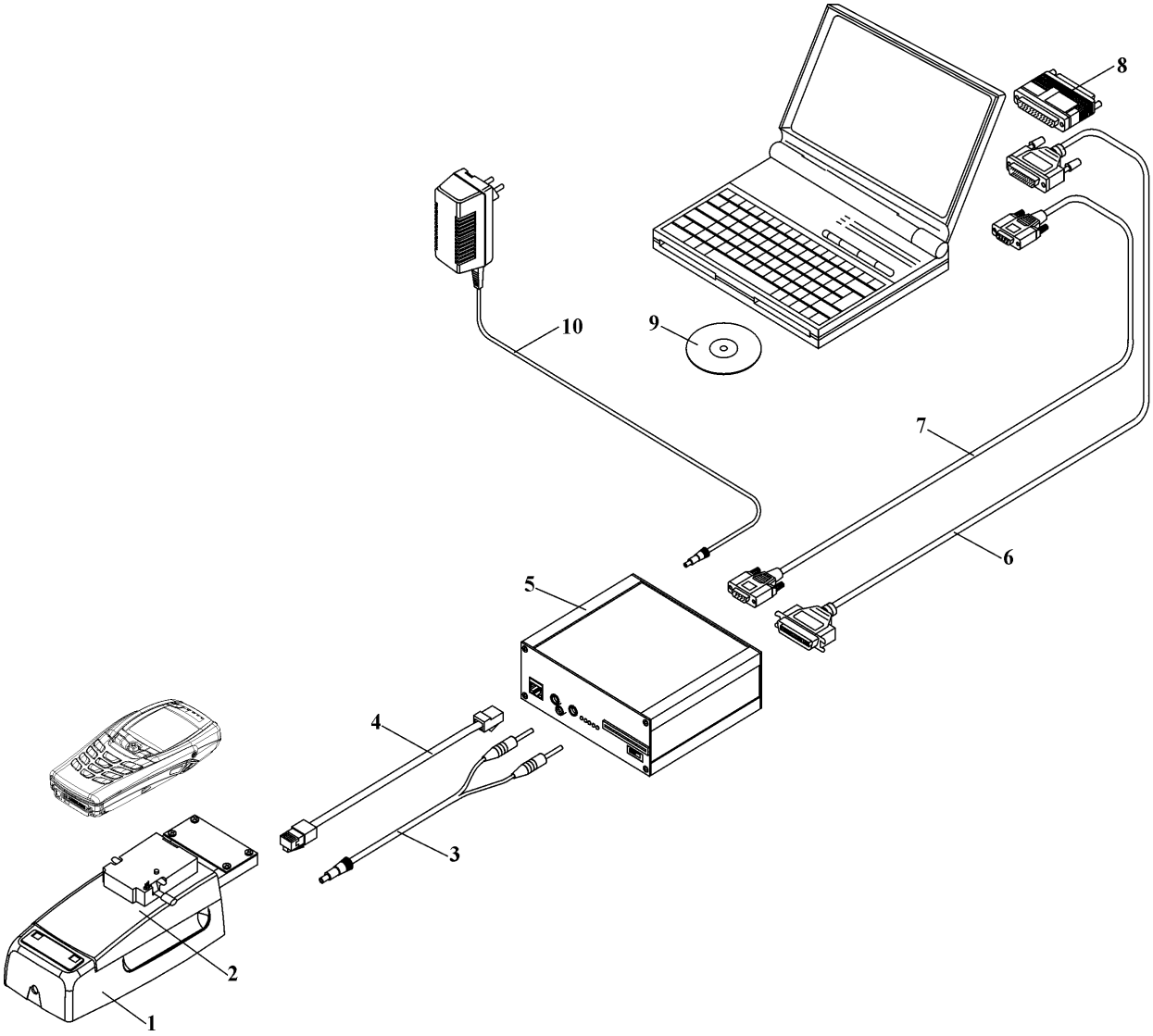


Figure 3: JBV-1 Flash concept

Item	Type	Description	Code
1	JBV-1	Docking station	0770298
2	MJF-32	Docking station adapter	0770528
3	PCS-1	DC power cable	0730012
4	XCS-4	Modular cable	0730178
5	FPS-8	Flash prommer box	0080321
6		Centronics (printer) cable, incl. in FPS-8 sales package	0730029
7	AXS-4	RS232 (D9 – D9) cable, incl. in FPS-8 sales pack	0730090

Copyright ©Nokia. All rights reserved.

Item	Type	Description	Code
8	PKD-1	Software protection key (Dongle)	0750018
9	Phoenix Service SW		8409031
	Phoenix Service SW	CD-ROM	0775311
	NSB-9 Flash SW data		8415951
	NSB-9 Flash SW data	CD-ROM	0775344
10	ACF-8	AC Charger, incl. in FPS-8 sales pack	0680032

Copyright ©Nokia. All rights reserved..

Service Concept

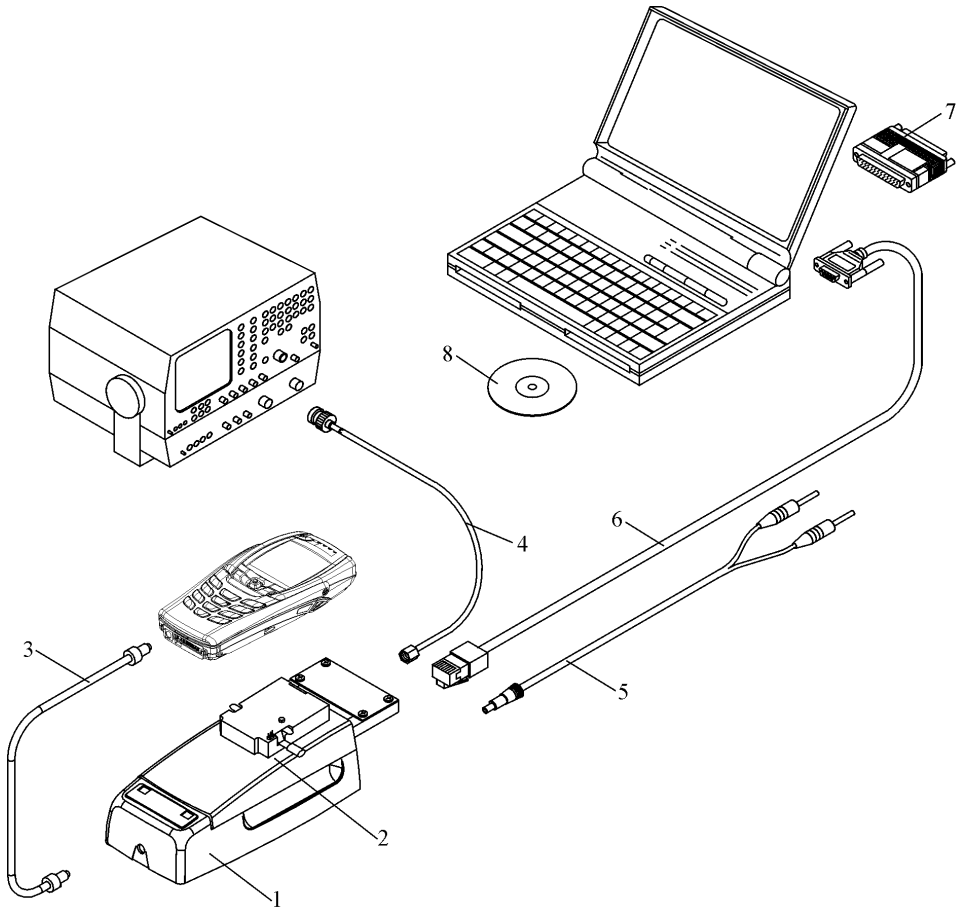


Figure 4: Service Concept

Item:	Service accessory:	Type:	Product code:
1	Docking station	JBV-1	0770298
2	Docking station adapter	MJF-32	0770528
3	DC-DC cable	SCB-3	0730114
4	RF antenna cable	XRF-1	0730085
5	DC power cable	PCS-1	0730012
6	Service MBUS cable	DAU-9S	0730108
7	Software protection key	PKD-1	0750018
8	Phoenix Service SW		8409031
	Phoenix Service SW	CD-ROM	0775311
	NSB-9 Flash SW data		8415951
	NSB-9 Flash SW data	CD-ROM	0775344

 Copyright ©Nokia. All rights reserved.

Parallel Flash concept

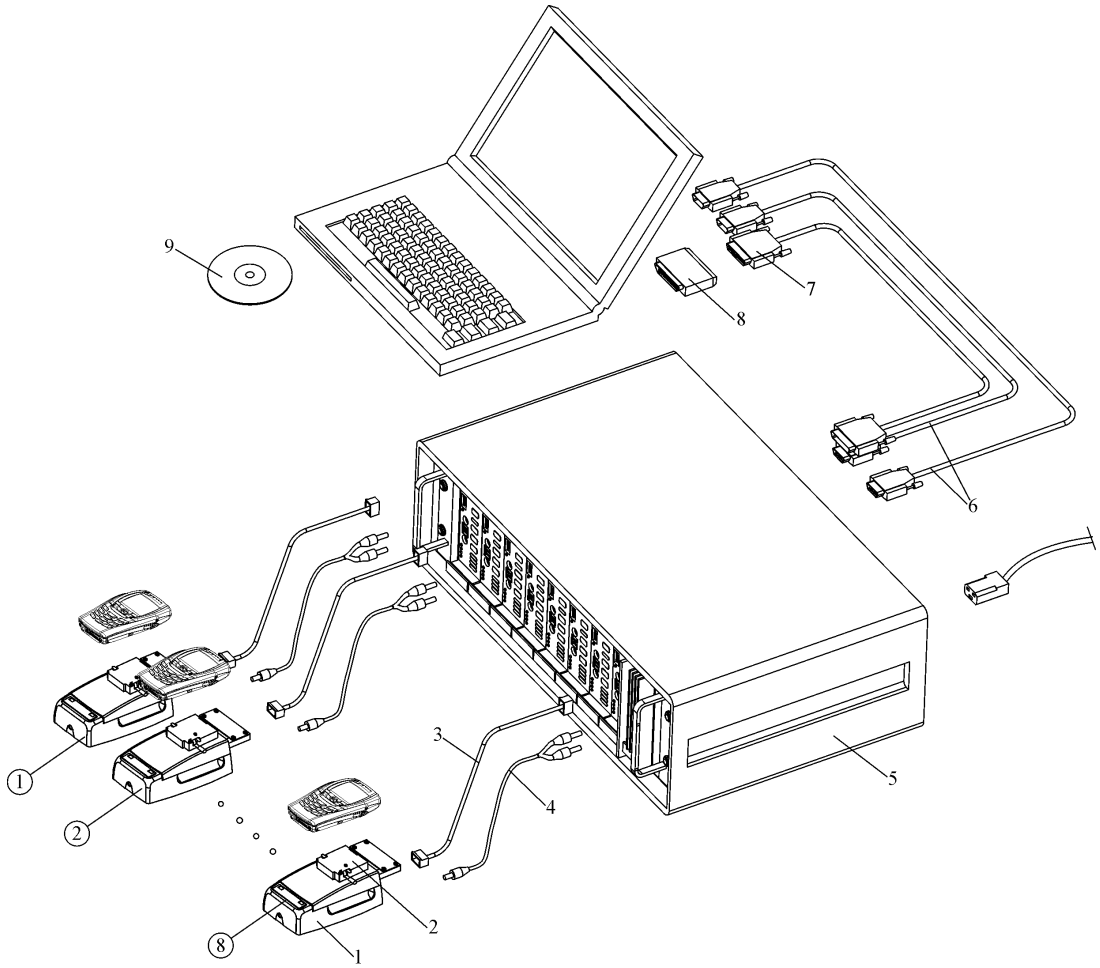


Figure 5: Parallel flash concept

Item	Type	Description	Code
1	JBV-1	Docking station	0770298
2	MJF-32	Docking station adapter	0770528
3	XCS-4	Modular cable	0730178
4	PCS-1	DC power cable	0730012
5	FPS-8C	Parallel flash prommer	0080396
6	AXS-4	RS232 (D9 – D9) cable, incl. in FPS-8C sales package	0730090
7	Printer cable	Centronics (printer) cable, Incl. in FPS-8C sales pack	0730029
8	PKD-1	Software protection key (Dongle)	0750018
9	Phoenix Service SW		8409031
	Phoenix Service SW	CD-ROM	0775311

 Copyright ©Nokia. All rights reserved..

Item	Type	Description	Code
	NSB-9 Flash SW data		8415951
	NSB-9 Flash SW data	CD-ROM	0775344

Copyright ©Nokia. All rights reserved.